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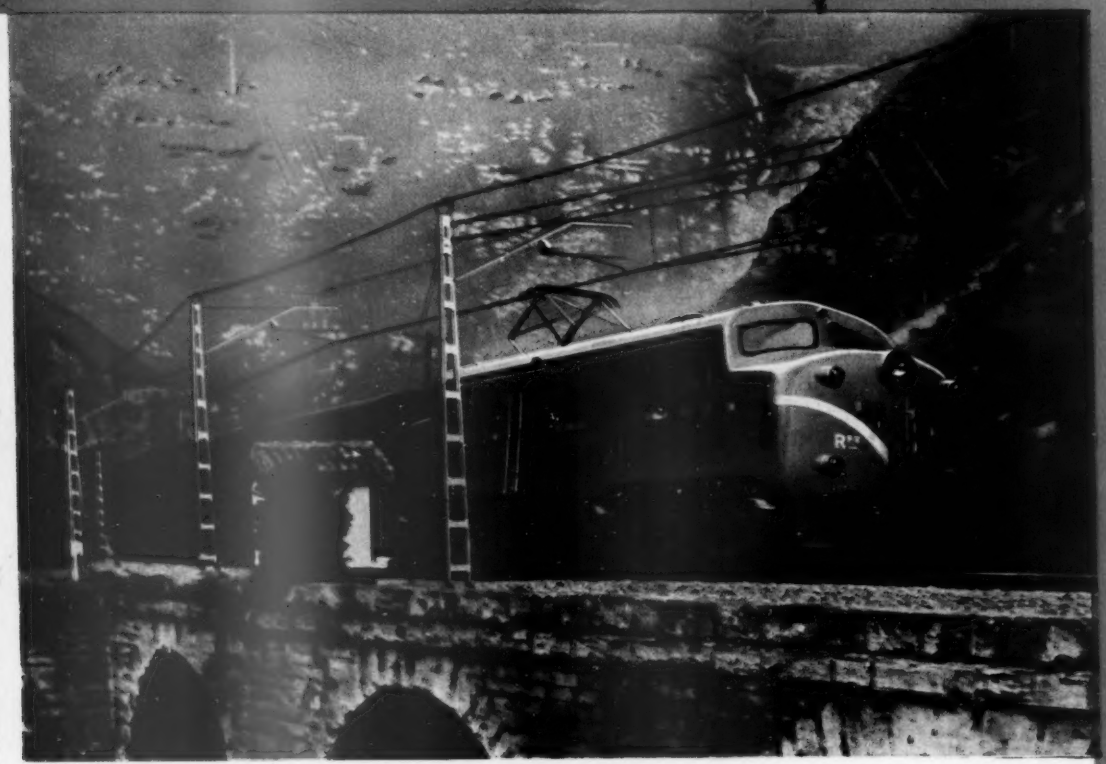

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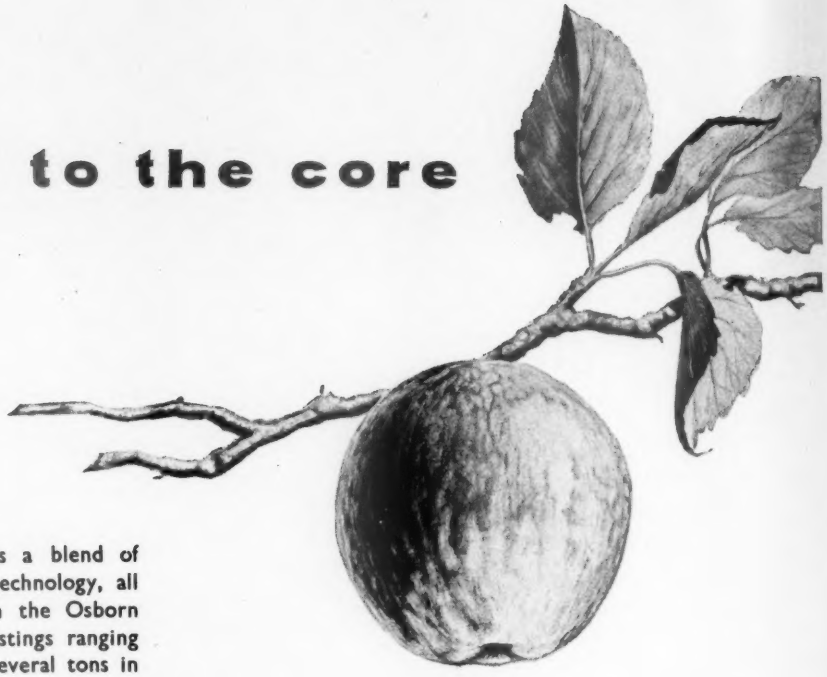

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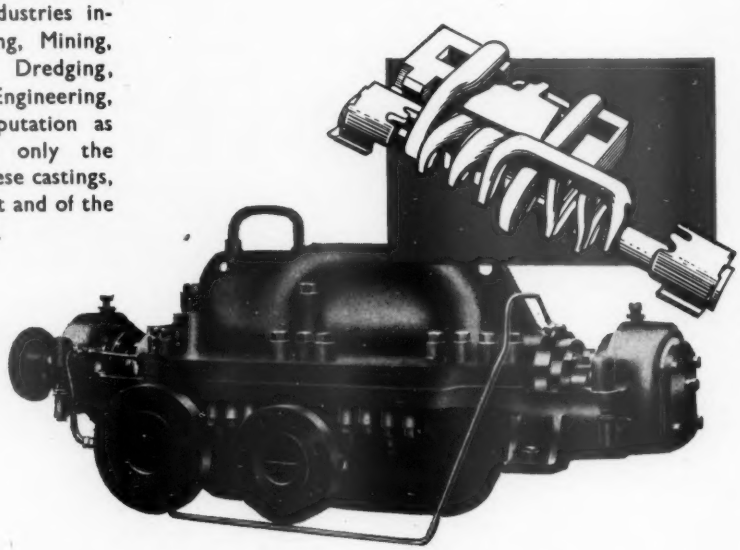

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Vol. 108] FRIDAY, APRIL 11, 1958 [No. 15

CONTENTS

	PAGE
Editorial Notes	409
The Late Sir James Milne	411
Plans for Improvement in Denmark	411
The Nigerian Railway in 1956-57	412
Interference with Signalling Circuits	412
Railway Facilities at Modernised Tilbury Dock	413
Letters to the Editor	414
The Scrap Heap	415
Overseas Railway Affairs	416
Planning Services for Electric and Diesel Traction	418
Western Region Diesel Services	420
Rail Welding and Methods of Laying in New Zealand	421
Electric Traction Section	423
Personal	429
New Equipment and Processes	432
News Articles	434
Contracts and Tenders	437
Notes and News	438

Keeping Faith in Labour Relations

NO freedom from industrial unrest in the nationalised transport undertakings, as in other industries, can be hoped for unless the parties concerned show good faith. In the present dispute between the London Transport Executive and the Transport & General Workers' Union over the busmen's pay claim, it was the union which took the initiative in asking the Minister of Labour & National Service to refer the claim for arbitration to the Industrial Court. The Executive accepted the court award of 8s. 6d. a week for Central Road Services employees only, though it would be hard indeed to find, through effecting economies and reducing services, the £1,000,000 a year needed to meet this wage increase. The union has rejected the award and now threatens a strike. Neither party was bound to accept the court award, but there was clearly a moral obligation to do so; nor was there any reason to follow the refusal with a precipitate threat to strike without any apparent great effort to reach a settlement. That is to say nothing either of the inability of London Transport to find the money to meet the additional demands of the union, or of the disastrous effects of a strike; the latter have been eloquently described by Sir John Elliot, Chairman of the L.T.E., as reported on another page this week. It may be that a solution will be found and a strike averted; but the action of the Transport & General Workers' Union has done great harm to the cause of good relations in the public transport industry. As we went to press, the award was awaited of the Railway Staff National Tribunal on wage claims by the three railway unions, the National Union of Railwaymen, the Associated Society of Locomotive Engineers & Firemen, and the Transport Salaried Staffs' Association. Reference of these matters to the Tribunal was in accordance with the prescribed procedure. Whatever the award, it would be most unfortunate if it were not accepted by all parties concerned. Apart from their serious financial situation, British Railways are in no position to be involved in industrial disputes. Railwaymen of all grades should concentrate on achieving efficiency; that alone can engender the prosperity which can result ultimately in appreciable improvements in the pay of railway employees.

The London Transport Tradition

OF the two great architects of public transport in London, the most complex and efficiently conducted urban system in the world, now administered by the London Transport Executive, were Lord Ashfield and Frank Pick. The long partnership of these two men has left its impression not only on London traffic, for facets of its organisation have been adopted in many parts of the world. For many years a portrait of Lord Ashfield by Sir William Orpen has hung in the chairman's room at 55, Broadway, and now it is joined by a posthumous likeness of Mr. Frank Pick, formerly Vice-Chairman of the London Passenger Transport Board, by Mr. Patrick Larking, R.O.I. It was unveiled at a ceremony on March 31, at which the Chairman of the London Transport Executive, Sir John Elliot, paid tribute to the work of Pick during the many years when he was a member of the famous partnership, which, many will regret, belonged to an age which has passed. Sir John Elliot expressed the sense of many who were present when he said that it was not possible to perpetuate Frank Pick's memory by hanging his portrait in the room, for the true memorial to a man's work was not in stone or paint, but in men's minds, in the inspiration which sprang from his name, and the example and tradition which down the years it fed to all who entered the service he adorned.

Modernisation in Peru

THE approval by the World Bank of a loan equivalent to $15,000,000 for the rehabilitation and modernisation of the two most important systems in Peru, the Central and the Southern Railways, will be welcomed by British suppliers of railway equipment. The loan is to be made to the Peruvian Corporation Limited, the British company which is now a wholly-owned subsidiary of the Peruvian Transport Corporation Limited, a privately-owned Canadian concern. The Peruvian Corporation has undertaken a three-year improvement programme for the Central and Southern Railways, both of which it owns and operates. Among equipment likely to be bought are diesel-electric locomotives, passenger coaches, goods wagons, permanent way material, and signalling equipment. The programme is scheduled to be finished in 1960 and will cost some $20,000,000. The World Bank loan will cover three-quarters of the total cost and the Corporation will finance the remainder from its own resources. It is anticipated that requirements will be put out to private tender by the middle of the year.

The New Railway in North-East India

THE North-East Frontier Railway of India, formed out of the North Eastern Railway, is now functioning independently as the eighth railway in the Republic. Mr. D. C. Baijal, the General Manager, assumed his duties

some weeks ago, with his headquarters at Pandu, in Assam. A list is given in our personal section of the principal officers of the N.F.R., the initials by which the new system is officially designated to distinguish it from the residual North Eastern Railway (N.E.R.). Pandu, though far from the western end of the railway, is convenient for the commercial centres of the Assam Valley. Mr. Baijal, who before his present appointment was Secretary of the Railway Board, has an exceptional knowledge of what is thought and planned in New Delhi and of what is happening on railways throughout India; this should serve him in good stead in a necessarily isolated post, for his railway is remote from the rest of the Indian system. The total mileage of the N.F.R. at present, until the boundary with the N.E.R. is moved west from Katihar to Barauni, is 1,738; this is virtually all metre gauge, except for some 50 miles of narrow gauge of the former Darjeeling Himalayan Railway.

Overseas Railway Traffics

EAST African Railways & Harbours approximate railway revenue for February amounted to £1,555,000 compared with £1,371,000 in February, 1957, an increase of £184,000. The aggregate revenue for the first two months of the year was approximately £3,306,000, an increase of £410,000 on the corresponding period of last year. This is attributable mainly to higher rates and fares introduced last October. There were substantial increases in receipts from all services with the exception of other coaching traffic. Canadian Pacific Railway revenues for February were $33,990,522 (against $37,651,740 for February, 1957) and railway expenses $33,608,038 ($37,033,764), so that net earnings were $382,484 ($617,976). Aggregate net earnings from January 1 were $70,105,872 ($63,334,007). Salvador Railway Company receipts for January were colones 258,000 compared with colones 453,000 for January, 1957. Aggregate receipts for the period July 1, 1957, to January 31, 1958, were colones 1,519,000 compared with colones 1,886,000 for the corresponding period of 1956-57; a decrease of colones 367,000. Figures received from the Midland Railway Company of Western Australia Limited show that estimated road and railway receipts for January were £A70,247 (against £A65,367 for January, 1957).

Planning Passenger Services

THE first of the summaries appears, on page 418, of the reports on replies by railway managements to the questions on the agenda of the seventeenth session of the International Railway Congress Association in Madrid in September next; these questions were listed in our issue of September 6, 1957. The report now summarised deals with answers to Question 6, one of two to be considered by Section III (Working) of the Congress. The question is that of the principles " which may lead to a rational and efficient organisation " in planning passenger services on changing over from steam to diesel and electric traction. In accordance with I.R.C.A. practice, the replies are divided into two groups; those now reported on are from railways in English-speaking countries, or with British associations, or which follow British practice. The reporter is Mr. G. F. Fiennes, Line Traffic Manager, Great Northern, British Railways, Eastern Region. The subject is very broad; and the variety of environments in which the railways function is great; they range from Britain to Norway, Malaya, Japan, and the U.S.A. In the circumstances he has done well in avoiding a mere catalogue of answers and in reaching some conclusions, if not unexpected ones.

Pioneer Work by British Railways

EVEN when allowance is made for Mr. Fiennes' greater familiarity with British practice in passenger train timetabling and operation, it is clear that this country has led the way not only in providing frequent and fast trains, but also, and relatively recently, in research into ways of making services more attractive and cheaper to provide. It remains to be seen, however, what is revealed by the replies to Question 6 from administrations which follow Continental practice. A good deal of conservatism is evident in many countries in matters such as the elimination of intermediate stops, arranging interval services, and maintenance of an acceptable temperature in coaches. In general, this is not a criticism which can fairly be made today of British Railways as far as concerns passenger traffic, though many improvements still could be made. An indication of the far-reaching measures being taken by the Western Region to re-cast and improve its passenger services on the introduction of further diesel motive power, is given in an article on page 420; this also shows that that Region and its predecessor, the Great Western Railway, have been pioneers in this field.

Technical Progress in New Zealand

AMONG the many developments and modernisation measures taken in recent years by the New Zealand Government Railways administration are the mass-production of flash-butt rail-welding at central depots and novel methods of rail-laying. Rail-welding at site has been practised in the Dominion for the past quarter-century, but machine-welding in bulk has been introduced during the past three years. The method of laying described in an article on another page was inspired by the completion of the 5½-mile Rimutaka tunnel and the 14½-mile realignment on which it is situated, and by the need for their rapid track-laying. The process of machine-welding is also outlined in the article, 39-ft. and 42-ft. rails being welded to form three-rail 117-ft. or 126-ft. lengths for laying in the open, and into nine-rail 351-ft. lengths for use in prefabricated track laid in the tunnel. The 15·4-mile realignment with a ruling gradient of 1 in 70 has replaced the old tortuous 24·8-mile Fell-worked section of line with 1 in 35 and 1 in 15 gradients, much sharper curves and 665 ft. greater rise and fall. The journey from Wellington to Masterton which previously took nearly 2½ hr. now takes only 1 hr. 40 min. as a result of its opening to traffic

Silicone Insulation in L.T.E. Motors

IN announcing the results of experiments with silicone insulation of traction motors, the London Transport Executive has taken a step which will be welcomed by the railway and electrical industries. Silicone materials are being adopted both in motors and smoothing chokes in new motive power for the British Railways 50-cycle programme (see our August 30, 1957, issue), and while their properties are well known, further information on the methods of applying them and on their behaviour in traction service is valuable. An article elsewhere describes the trials conducted with silicone-insulated armature bars and field coils in Underground motors submitted to higher temperatures than normal by restricting the ventilation, and also laboratory experiments conducted in conjunction with Midland Silicones Limited, and H. D. Symons & Co. Ltd. Use of silicones is specified already for rewinding Metadyne machines, and the Executive now states its intention of specifying these materials in a fair proportion of traction motors for new rolling stock. The possibility is mentioned of taking advantage of their heat-resisting properties to build totally-enclosed motors no larger than present self-ventilated machines—an example of how modern developments often permit the revival of earlier practice, abandoned in the past for reasons unconnected with its intrinsic advantages.

New Railway for South Australia

A PROPOSED new standard (4-ft. 8½-in.) gauge railway from Port Augusta at the head of Spencer's Gulf in South Australia to Whyalla, an industrial centre on the coast of the Gulf will, when built, extend the Central Australia Railway standard-gauge line a further 43 miles south. Blast furnaces and other works of the Broken Hill Pty. Co. Ltd., the largest steel-making concern in Australia,

are situated at Whyalla and it is the port through which iron ore from neighbouring deposits is shipped. The ruling gradient of 1 in 120 will enable a single diesel locomotive to haul a goods train of up to 1,300 tons. There is at present a 3-ft. 6-in. gauge railway into Whyalla from the Iron Knob and Iron Baron ore deposits. This is 33 miles long and is owned and worked by the Broken Hill Pty. Co. Ltd. The choice of standard gauge for the projected line is in conformity with the present policy, which envisages ultimate conversion to 4 ft. 8½ in. of the 3-ft. 6-in. gauge lines in South Australia.

Overrunning at Herne Hill

DESPITE the enginemen's assertions, Colonel D. McMullen, whose report is summarised in this issue, was obliged to conclude, by reason of the very complete proving arrangements found to be in order, that the collision at Herne Hill on June 30, 1957, arose from the boat train passing adverse distant and home signals without reduction of speed. It struck a light engine just moving on a clear starting signal. The present signalbox, with extensive track circuiting, was brought into use in 1956, to replace the long familiar ones at each end of the station. The light engine driver, seeing a collision to be inevitable, pluckily strove to keep ahead, which appreciably reduced the shock and consequent damage, and fortunately no fatality resulted. Cut, bruised and shaken, he endeavoured to set injectors working and put out the fire. Warning type A.T.C. should have been effective in such circumstances, but the route is not in high priority for it, as colour-light signalling is to be installed. This is not, states Colonel McMullen, a substitute for A.T.C., but does go to make such errors less likely.

The Late Sir James Milne

THE death, recorded elsewhere in this issue, of Sir James Milne, General Manager of the Great Western Railway from 1929 to 1947, brings more than a sense of personal loss to those who knew him. It serves as a reminder that the dwindling ranks of the old school of railwaymen have been further diminished. Sir James Milne possessed great ability and knowledge gained the hard way through practical experience, and was a man of a decisive character which combined shrewdness and energy with determination. These qualities particularly fitted him for the difficult and arduous task of managing for 18 years the fortunes of a railway of which at one time it was said that "seven years of office killed any Great Western General Manager." Sir James Milne, who became General Manager of the G.W.R. at the early age of 46, brought a young man's energy and persistence to bear on the many problems encountered on that system during an abnormal and critical period of its history. He was an outstanding leader of a deeply loyal and brilliant team all imbued with the long and high traditions of a railway which had maintained its identity from its earliest days. His success and its recognition throughout the industry and in Government circles are reflected in the high honours he received during the succeeding seven years. Already the recipient of the C.S.I. for his work under Lord Inchcape on the Indian Re-Trenchment Committee, he was knighted in 1932 and, in 1936, created a K.C.V.O.

When he resigned from the Great Western Railway in 1947, considerable surprise was expressed that he did not assume high office in the British Transport Commission or on its Railway Executive. That he had been offered, and had declined, the Chairmanship of the latter body was an open secret, but his reasons for refusing were never officially stated. It is possible that, accustomed to the exercise of a considerable measure of autonomy in his capacity as General Manager of the Great Western Railway, he felt he might not enjoy a similar degree of freedom of action within the confines of the Railway Executive. Be that as it may, there can be little doubt that, from the point of view of a man of his training, the conditions of service facing an executive railway officer during the period succeeding Sir James Milne's retirement must have seemed fraught with managerial frustration. He would hardly have taken kindly to the growth of reference to committtee which was shortly to become an established facet of executive practice throughout all levels of British transport.

Following traditional methods of management, Sir James Milne dealt successfully with problems arising from six years of trade depression, three years of subsequent recovery, the outbreak of war, and five years of subsequent wartime conditions under Government control. He was Chairman of the General Managers' Conference of the Railway Clearing House from 1939 to 1944—a record length of tenure of office. The duties of that position, never a sinecure, were made particularly difficult during the wartime period in which Sir James Milne carried them out. Superimposed on his already heavy wartime responsibilities at Paddington and his work as a member of the Railway Executive Committee, they combined to form a triple task of no small magnitude. This work he took in his stride. He was a man of great pertinacity and not easily diverted from any course on which he had decided. His opinions were not formed dogmatically and were always free from bias. He was accessible to his officers and always favoured the frank approach. He was a fine example of the railway executive of stature and personality, more often developed by the competitive conditions of private enterprise than under the restrictions imposed by public ownership, and whose appearance today is rare.

Plans for Improvement in Denmark

THE Danish State Railways improvement programme for the financial year commencing April 1, 1958, includes several important new projects. Work is to begin on an extension of the Copenhagen suburban electrification. The electrified line from Copenhagen Central to Glostrup will be extended westward to Taastrup, some four miles. This section will in future have two tracks for main-line steam and diesel and two (at the western end only one) tracks for suburban electric trains. As a result of electrification it will be possible to relieve the heavily trafficked main line from Copenhagen westwards of a number of local trains to Roskilde. The work is to be completed in three years.

At Elsinore rearrangement of the tracks, notably for goods trains, is being carried out. On completion of this work, it will be possible to increase the length of goods trains between Copenhagen and Elsinore, with consequent economies in operating. Elsinore is the Danish terminus of the train ferry to Hälsingborg, in Sweden. At Korsør, the eastern terminus of the Great Belt train ferry, the layout of the yard has become obsolete, and to obtain the full advantage of the large power of the "MY" class diesel locomotives the tracks must be lengthened. The station tracks are to be completely rearranged, new sidings provided, and a small group of tracks arranged close to each ferry berth to simplify shunting.

At Aalborg, in Northern Jutland, the station is to be remodelled. A new bus station is being built on the site of the present goods station, which is adjoining the main passenger railway station, so that all passenger traffic in the city will be centred on the railway station, and easy interchange facilities provided. A new goods station will be built with ample space for road vehicles.

The Gedser/Grossenbrode route was opened after the second world war as an intermediate route, until the direct route via Rødby/Puttgarten could be opened. This last project involves, however, heavy expenditure both in Western Germany and in Denmark. In Germany it necessitates a railway and road to Puttgarten with a harbour with ferry berths at the latter point, also a high-level bridge across the Fehmarn Sound, through which passes much shipping. In Denmark the necessary works are the building of a ferry harbour at Rødby, a railway and a motor road thereto, a new rail-and-road bridge across the Guldborgsund at Nykøbing and rebuilding of the station there. Work on the railway from Nykøbing

to Rødby and the motor road was begun during the war, but was discontinued. In recent years negotiations have been carried out between the Danish and German governments, and it is now agreed that the new route shall be completed. The work will probably take five years. Work on the Danish side has started and will be continued in 1958 with the building of a new low-level road-and-rail bridge across the Guldborgsund; this will have a movable span. The new route to Germany and beyond will be more than 2 hr. faster than via Gedser/Grossenbrode.

The Nigerian Railway in 1956-57

WE have received a copy of his report upon the Nigerian Railway for the year ended March 31, 1957, from Colonel Sir Ralf Emerson, Chairman & General Manager of the Nigerian Railway Corporation. It covers the first complete 12 months' working of the railway as a Corporation. Once again total working receipts were a record, at £14,296,000, an increase of 4·6 per cent over the 1955-56 revenue. Both passenger and goods revenues were higher; the former improvement was largely due to the success of the campaign against ticketless travel and to additional train services. In spite of the groundnut crop in 1956 being 145,000 tons smaller than that of the previous year, goods train receipts increased by £535,000. There was also a part-failure of the cotton crop and the consequent shortage of money available in the country was responsible for fewer movements of imports and kola nuts, usually bringing in valuable railway revenue.

The following are some of the principal results for 1956-57 as compared with those of the previous year:—

	1955-56	1956-57
	Thousands	*Thousands*
Passenger journeys	6,310	7,271
Tonnage hauled (paying)	2,000	2,052
Passenger train-miles	588	538
Mixed train-miles	1,134	1,291
Goods train-miles	4,698	5,125
Departmental train-miles	181	217
	£ *thousands*	£ *thousands*
Passenger parcels & mails receipts	1,695	1,866
Goods & liverstock receipts	11,407	11,942
Road transport receipts	122	124
Total operating receipts	13,397	14,172
Operating expenditure	10,709	12,182
,, surplus	2,688	1,990
Interest on capital	943	1,000

In the programme of capital development for the period ending March, 1960, £10,000,000 was to be spent on additional equipment and £5,621,000 on the replacement of life-expired equipment. Altogether 18 1,200-h.p. diesel locomotives were to be purchased for main line work, eight of them to replace 20 uneconomic steam locomotives and to meet traffic requirements in 1959. Three 350-h.p. shunting diesels were also being ordered.

During the year under review no additional steam or diesel locomotives were purchased, but 28 goods vehicles and 19 tank wagons were added to the stock in service, all being vacuum-braked bogie vehicles; 786 others of various types were on order. The following coaching stock was placed in traffic during the year: 26 thirds, one restaurant car, 21 inspection coaches; four baggage, nine passenger brake and eight other vans, and nine first-and-second composite day coaches; a further 87 coaching vehicles were on order, including two two-car diesel sets.

On the civil engineering side the remodelling of six yards was in hand and the construction of six new crossing stations. The alignment of the Bornu extension was chosen from the traffic survey and engineering reconnaissance reports; the route is from Kuru, on the Kafanchan-Jos branch, to Maiduguri via Bauchi, Gombe, and Bajoga. The Research Section completed the first year of its separate existence. The field covered included rail-wear on curves, wheel-flange wear, bogie design and in particular method of pivoting, boiler wash-out techniques, journal wear on coupled wheels, and lubrication of valves and cylinders.

The Signal & Telegraph Section took over from the Posts & Telegraphs Department all station telephones, telegraphs and apparatus on the Lagos-Apapa-Ibadan section and the Idogo branch. A major signalling installation was completed at Ibadan north, and the six new crossing stations were completely signalled. New double-wire installations were completed or nearly completed at 26 stations.

Road transport earnings from all sources totalled £124,000, against £122,000 in 1955-56. The 136-mile passenger service between Gusau and Sokoto was withdrawn, due to lack of patronage. Goods tonnage haulded rose by about 15 per cent.

The report opens with a statement to the effect that the area of Nigeria is 336,850 sq. miles. It had a population of 31,156,029 Africans and 15,354 expatriates in 1951-52. Its coastline measures 500 miles and two seaports are served by the Corporation's Railway; this has a 3-ft. 6-in. gauge route-mileage of 1,780 and 2 ft. 6 in. gauge 133 miles, or 1,913 route-miles in all.

Interference with Signalling Circuits

THE decision to adopt the 50 cycle system of traction in Great Britain directed attention to particular aspects of the problem of the interference liable to occur in signalling and associated circuits, both as regards any effect on the actual signalling operations or clarity of telephonic communication and the protection of users of the equipment from shocks, electrical or acoustic. Such problems had been encountered in Britain when a.c. electrification appeared on the then Midland Railway Heysham line and later on the L.B.S.C.R. South London and other lines before the 1914 war. Various measures were taken, which we believe, proved reasonably effective and kept such interference or risks as were experienced within acceptable limits.

By 1914 the situation had altered very considerably from that obtaining when electrical signalling circuits first became used to any extent on railways, and the only interference to cause real concern to those responsible for them arose from lightning and related atmospheric effcts. These at times caused appreciable damage to apparatus and even harm to those working it. This led to much thought being given to the provision of protective devices, of which many designs appeared and, greatly improved, remain in use today. Occasionally the magnetism of the indicators of telegraph and block instruments would be destroyed or, worse still, reversed until the so-called induced needles, rendered unnecessary in turn by the remarkable quality of the permanent magnets now obtainable, gave protection against these risks.

With the coming of electric power and traction supplies there arose the problem of protecting against stray or "foreign" current and inductive effects. The early electric tramways and railways in Great Britain used the running rails as an earth return, and as many of the governing factors were as yet little understood much undesirable influence on signalling equipment was at times experienced, even to the extent of irregular working. This equipment itself had up to then been worked on an earth return and it became clear that this might have to be given up, at least in some areas. By this time the telephone also had come into fairly extensive use and these new earth currents at times made intelligible conversation impossible. Their effects were indeed found to extend to remarkable distances. At the North Walsham cable station in Norfolk, controlling the lines to Northern Europe, the movements of the trains on the City & South London Railway, 130 miles away, could be clearly detected; but ordinary telegraphic apparatus remained uninfluenced, even in London itself. In due course the very strict Board of Trade rules about return circuit voltage drop, designed to combat the electrolysis evil, contributed to diminish these other troubles; some traction systems, including tramways, were installed with an insulated return in an attempt to better the position

The adoption of a.c. power transmission and then electrification created additional problems and much trouble in some Continental countries using magneto-operated a.c.

block apparatus, originally adopted to give immunity to false operation by contact with d.c. telegraph circuits. Much research was undertaken into the phenomena experienced, by many managements and postal authorities, and large sums expended in cabling signalling and communication circuits, removing them to a distance from the railway, erecting screening wires, providing booster transformers and so on. On this basis the International Consultative Committee on long-distance telephony was able to reach certain conclusions and issue recommendations covering safety of personnel and operating efficiency.

The problem remains, however, a subject for thought and, in certain conditions, experiment, which indeed the British Transport Commission is having to conduct in connection with the first sections of 50-cycle electrification to go into service, for which new telephone cabling is being provided. It was therefore of great value to members of the Institution of Railway Signal Engineers to have on March 12 an authoritative paper on interference in lineside telephone circuits by Dr. A. Rosen setting out the essentials involved, in supplement to the able one by Mr. D. R. Turner, given in 1953, to which Dr. Rosen made reference.

British Transport Commission Traffic Receipts

THE total freight, parcels, and mails receipts of British Railways for Period 3, the four weeks to March 23, at £27,480,000 compare with £29,242,000 for the corresponding period of 1957, and with £27,269,000 for Period 3 of 1956. The temporary inflation of railway freight receipts caused by the Suez incident and the resultant restrictions on fuel oil supplies had begun to subside by March of last year; but traffics for that period were still greater than would have been the case had normal oil supplies been available. There is a truer comparison with 1956; in view of rate increases during the past two years, it is not encouraging.

Merchandise and livestock receipts at £7,765,000 this year compare with £8,476,000 for the corresponding four weeks of two years ago; mineral receipts at £3,988,000 with £4,040,000 in 1956; and coal class traffics at £10,624,000 with £10,278,000. It is impossible, so soon after publication of receipts during March, to try to assess the effect on coal despatches of any restriction of output.

—	Four weeks to March 23		Incr. or decr.	Aggregate for 12 weeks		Incr. or decr.
	1958	1957		1958	1957	
	£000	£000	£000	£000	£000	£000
Passengers—						
British Railways ..	8,658	9,361	– 703	25,102	27,313	– 2,211
London Transport:						
Railways	1,804	1,865	– 61	5,393	5,644	– 251
Road services ..	4,433	4,689	– 256	13,164	13,910	– 746
Provincial & Scottish buses	4,073	4,272	– 199	12,092	12,816	– 724
Ships	218	212	+ 6	665	608	+ 57
Total passengers ..	19,186	20,399	– 1,213	56,416	60,291	– 3,875
Freight, Parcels & Mails—						
British Railways:						
Merchandise & livestock	7,765	9,301	– 1,536	22,973	28,220	– 5,247
Minerals	3,988	4,375	– 387	11,917	13,072	– 1,155
Coal & coke ..	10,624	10,475	+ 149	32,446	32,483	– 37
Parcels, etc., by passenger train ..	4,080	3,994	+ 86	11,724	11,478	+ 246
Collection & delivery, etc. ..	1,023	1,097	– 74	2,906	3,240	– 334
Total freight British Railways	27,480	29,242	– 1,762	81 966	88,493	– 6,527
Others*	4,272	4,345	– 73	12,387	12,521	– 134
Total Freight, Parcels, & Mails	31,752	33,587	– 1,835	94,353	101,014	– 6,661
Total	50,938	53,986	– 3,048	150,769	161,305	– 10,536

* Inland waterways, freight, road haulage, and ships

British Railways passenger receipts for Period 3 were 7·5 per cent below the corresponding figure for 1957. No doubt the petrol shortage last year was one contributory factor; but at £8,658,000 for these four weeks of the current year they exceed relatively slightly the £8,073,000 for Period 3 of 1956, despite fare increases in the meantime. The cold weather during the past few weeks may have restricted excursion and similar travel, though the growth of private motoring must be taken into account. On the whole, passenger traffics are disappointing, in view of the introduction of many diesel services during the past two years. London Transport railway and road traffics for the period under review are 3·2 and 5·4 per cent respectively lower than last year.

The total traffic receipts of the British Transport Commission for Period 3 are 5·6 per cent less than for the corresponding four weeks of 1957; the aggregate for the 12 weeks ended March 23 is 6·5 per cent less than last year's figure—which is disquieting.

PERCENTAGE VARIATION 1958 COMPARED WITH 1957

	Four weeks to March 23	12 weeks to March 23
British Railways—		
Passengers	– 7·5	– 8·0
Parcels	+ 2·1	+ 2·1
Merchandise & livestock	– 16·5	– 18·5
Minerals	– 8·8	– 8·8
Coal & coke	+ 1·4	– 0·1
C. & D. services	– 6·7	– 10·3
Total	– 6·3	– 7·5
Ships (passengers)	+ 2·8	+ 9·3
British Road Services, Inland Waterways & Ships (cargo)	– 1·6	– 1·0
Road Passenger Transport, Provincial & Scottish	– 4·6	– 5·6
London Transport—		
Railways	– 3·2	– 4·4
Road services	– 5·4	– 5·6
Total	– 4·8	– 5·0
Aggregate	– 5·6	– 6·5

Railway Facilities at Modernised Tilbury Dock

BRITISH Railways and their predecessors—the London Midland & Scottish, the Midland, and the London Tilbury & Southend—have always had close relations with Tilbury Dock, the farthest downstream dock in the long series controlled by the Port of London Authority. It is the United Kingdom base for the P. & O. and Orient lines, famous in the Far Eastern trade. Passenger and cargo traffic are dealt with at this dock, where passengers normally embark and disembark at a transit shed, boat trains arrive and depart, and Customs examination takes place. Only when the tidal level is unsuitable for locking vessels into the dock are passengers received at a large landing-stage moored in the river just below the dock basin, and served by the terminal station, Tilbury Riverside. The main-line railway outside the dock area is the L.T.S. Line of the Eastern Region. The ordinary passenger trains run to and from Fenchurch Street, but boat trains, including the Swedish Lloyd specials in connection with the Tilbury-Gothenburg service, are routed via Woodgrange Park to and from St. Pancras, London Midland Region.

Dry docks and a lock form one connection between the main dock and the river via the dock basin, but its main entrance is at its west end through a large entrance lock, the main dock extending east and west, nearly parallel to the river. There are three branch docks, east, centre and west, running northwards from the main dock. Three berths on the south side and one at the west end of the main dock and also the east berth of the centre branch dock are used by large vessels of the two lines. During the last 10 years the P. & O. and Orient companies have each built three great liners of similar size, the largest being 723 ft. long, 93 ft. 6 in. beam, loaded draft 31 ft. and having a 29,754 gross tonnage. Hitherto the main dock has been 600 ft. wide throughout, so that these large ships could not turn to manœuvre into the centre branch dock, especially if another ship was berthed at the eastern end of the south quay.

Consequently, the P.L.A. has recently undertaken im-

portant modernisation works completed in June, 1957. These consisted primarily of the widening of the western part of the main dock by demolishing the old western quay on its north side and building instead a new quay, known as No. 1 berth, 842 ft. long, farther back northwards. This has widened the dock to 900 ft., and it has also been deepened to 42½ ft. thus enabling the largest vessels to turn into the branch dock. To accommodate rail and road traffic a new T-shaped transit shed has been built to serve the new berth; a conventional rectangular transit shed could not be approached by rail even using 7-ch. rad. curves. The new shed is served by three tracks on the west side and two on the east. In extension of the shed northwards is a passenger platform with umbrella-type roofing accommodating boat trains up to about 900 ft. in length. Vessels using this berth carry up to 1,500 passengers and 2,000 tons of cargo.

The quay frontage of the shed is 532 ft. long and the two wings each 203 ft. in length are used for cargo transit working. The central portion, 122 ft. wide, extends 430 ft. northwards and parallel to the railway tracks and platforms. It is divided into a baggage and Customs hall in front, 244 ft. long, and a modern and attractive reception hall with all facilities for passengers and their friends. To the north of the reception hall is a covered car embarkation area. Details of the various construction works involved are given in a paper entitled "No. 1 Berth, Tilbury Dock" recently presented to the Institution of Civil Engineers by Messrs. C. Peel, A. J. Carmichael and R. F. J. Smeardon, past or present officers of the Port of London Authority.

Briefly, the new quay is founded on 30-ft. by 30-ft. R.C. monoliths each with four 10-ft. 6-in. dredging wells; the sinking was mainly through gravel but the deepest sinking level was nearly 75 ft. below I.W.L. in chalk. The back of the quay is cantilevered out 16 ft. 6 in. giving an overall top width of 47 ft. 6 in. The transit shed is carried on 18-in. R.C. piles, mostly in groups of three, and 50 ft. long. Its roof consists of R.C. barrel-vaults of 40 ft. 8 in. span and having a 30 ft. 6 in. rad.; they are 122 ft. long except over the reception hall where they are 61 ft. The standard roof shell thickness is 3½ in., and natural lighting is provided by a central 8-ft.-wide opening in each barrel-vault covered with a lantern light. An unrestricted headroom of 20 ft. is provided throughout, the roof being supported by R.C. columns set within the walls.

The railway tracks are laid with B.S., F.B. No. 90R rails secured with elastic spikes to pre-stressed concrete Class B or hardwood sleepers in the open. The spikes are held in the concrete sleepers with bored uncreosoted oak plugs bound with helical reinforcement before being concreted in position. A hard rubber base-plate is used to give the rails their 1 in 20 cant. Where the tracks are in paved areas the rails are laid vertically flush with the paving on concrete beds and with guard rails, soleplates, distance blocks and tie-rods. They are secured with indented bolts set in concrete, the threads and nuts protected with bitumen and hessian. In the four-foot there is a base of lean concrete for macadam surfacing. Drainage is by scuppers leading to collecting pits.

All works were designed and carried out for the P.L.A. under the direction of Mr. G. A. Wilson, Chief Engineer, and Holloway Bros. (London) Ltd. were the main contractors.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Refreshment Rooms

March 29

SIR,—Mr. C. R. Clinker's letter, published in your issue of March 21, is timely. I would go further, however, and suggest that stations at which there are dining or refreshment rooms should be specially indicated on system maps, including those displayed at stations and in carriages, besides those in timetables and guides. This practice was adopted by at least one railway, the Furness, in pre-grouping days, and was much appreciated by the travelling public.

Whilst it may not be practicable to show the precise hours during which particular refreshment rooms are open, as these must necessarily vary according to local conditions, those which have a 24-hr. service could be specially marked.

Yours faithfully,

D. J. W. BROUGH

135, Mulgrave Road, Cheam, Surrey

Motive Power Economics

March 29

SIR,—Your Queensland correspondent, Mr. Roger Boland, whose letter is published in your March 28 issue, is mistaken in thinking that the Norfolk & Western Railway is still "a practically all-steam railway." In 1955 it used 263 steam locomotives in freight road service, but also introduced its first diesel for freight working. Ten more diesels were installed in 1956, and the number of steam locomotives assigned to freight movement dropped to 235. In that year diesels produced over 1,936 million gross ton-miles, or 4·5 per cent of the N. & W. total. The net train load increased from 2,553 tons in 1955 to 2,624 tons, while freight train speed was unchanged at 17·2 m.p.h. and gross ton-miles per train-hour rose by 2 per cent to 79,182. Earnings, before charges, were 9 per cent higher than in 1955 and the Norfolk & Western board announced that it was acquiring more diesels.

When operating statistics for 1957 are available, it will be interesting to see how the three coal roads in the Pocahontas Region have fared. The largest of the three, the Chesapeake & Ohio, has gone all out for diesel motive power. The smallest is the Virginian, operating 611 miles of road, with an electrified section of 136 miles in hilly country which keeps 19 electric locomotives busy. On the rest of the line it used 36 diesels in 1956 and, by dispensing with steam power and passenger train services, improved its earnings by 21 per cent.

Last year the coal roads again did well, largely because overseas shipments of coal reached an all-time record of 60·5 million tons. No less than 30 other railways improved their net railway operating income and the whole of the U.S.A. Class 1 lines operated at a ratio of 78 per cent, yielding them a net income of $732 million. It is certain that, but for the economies and greater efficiency secured through the general adoption of diesel motive power, the railway position in the U.S.A. would have been worse than it is in March, 1958.

On February 1 of this year, the Class 1 U.S.A. railroads owned 2,257 steam locomotives, but only 1,725 were serviceable; 532, or 23 per cent, were awaiting repairs. Of 587 electric locomotives, 65 were under repair; a percentage of 11 out of service is excessive and does not support the claim sometimes made that the electric locomotive is a stouter machine than the diesel. The railways installed 120 new diesel units in January, bringing total ownership up to 27,460 units. Only 993, or 3·6 per cent, of the total fleet, were out of action, leaving 26,467 units fit for service. It is not surprising that on February 1 the railroads had 323 more diesel units on order, but not a single steam or electric locomotive. The last order for a steam engine was placed in 1952, and the American railroads are now 92 per cent "dieselised."

Yours faithfully,

R. BELL

Clacton-on-Sea

THE SCRAP HEAP

Tilbury Line Half-Centuries

Barking seems to feature in railway history at fifty-year intervals. The London, Tilbury & Southend line from Gas Factory Junction, Bow, to Barking was opened on March 31, 1858. The electric services of the District Railway were extended to Barking on April 1, 1908, when Barking Station was rebuilt, and the line from East Ham quadrupled. In May, 1908, the District Railway introduced a nine-car train between Whitechapel and Barking, which was claimed to be the longest multiple-unit train in the world in regular operation. Fifty years later, an important stage has been reached in the extensive track reconstruction and flyover works at Barking, described in our issue of March 21.

Cloakroom-and-Dagger ?

The people who seem to their fellows to have exciting jobs are for ever disappointing the rest of mankind by failing . . . to show an awareness of their good fortune; and the men who work in the left luggage offices of the railways are a case in point. At any moment a tell-tale trickle or a slow tick-tock may inform them that some member of the criminal classes has left a body or a bomb with them. If not this morning, then certainly this afternoon an officer of the C.I.D. will leap from concealment to catch the sanguine burglar in the act of redeeming a suitcase rattling with stolen pearls. Yet the man at the counter seems unmoved. . . . A faint smile, as he tells us that his fee has gone up to 9d. alone betrays the man behind the mask.—*From "The Times."*

Faster Than the S.N.C.F.

The highest speed attained on a railway is the 205·6 m.p.h. reached on March 28, 1955, by a Co-Co electric locomotive of the French National Railways hauling a three-coach train on a run between Facture and Morceaux, on the line between Bordeaux and the Spanish frontier. Plans for a terminal airport for commercial aircraft in New Jersey are stated to include a monorail system capable of carrying passengers to and from New York or Philadelphia at up to 250 m.p.h.

Diesel Traction in East Africa

Masai warriors inspecting a North British "85" class diesel-hydraulic locomotive of East African Railways & Harbours

RUDOLF DIESEL

One of two stamps issued by Western Germany to mark the centenary of Rudolf Diesel (see the Scrap Heap of March 28). Both stamps are coloured sage green

Lights Out

When two sailors travelled with two girls on the late night Portsmouth to Brighton train, one of the sailors removed the light bulbs in the compartment. A leading steward was fined £1 with £3 3s. costs for unlawfully removing the bulbs.—*From the "Evening Standard."*

Commemorating Driver's Heroism

Mexico has recently issued a commemorative airmail stamp to mark the 50th anniversary of the death of Jesus Garcia, a locomotive driver whose heroism saved the town of Nacozari. In an emergency, he hauled out two burning car loads of dynamite, and took them far enough to avoid a devastating explosion within the city. He paid with his life for his heroic act. The suggestion for the commemorative stamp was made to the Mexican Government by a railway enthusiast in the U.S.A. Relatively few commemorative stamps of this kind have been issued relating to railways.

New Features in York Museum

Visitors to the Large Exhibits Section of the Railway Museum, York, can now see some new features. The most striking are the five locomotives which have recently been repainted. Work on three of them has only just been completed: G.N.R. 4-4-2 No. 990 *Henry Oakley* and N.E.R. Nos. 1275 and 910; the two latter illustrate, perhaps, the acme of locomotive livery design with their involved lining, varying shades of colour, and large areas of polished brass and copper.

The permanent way exhibits are redisplayed to show to better advantage the development which has taken place in this sphere from the small beginnings in the middle of the 17th century. A new exhibit is a section of wooden rail recently found 60 ft. below the ground in a lead mine in Weardale, and there is evidence that it was laid in the early 1800s. The mine was then owned by the Beaumont family, who first introduced this revolutionary idea into the country in their coal mines on Tyneside in the 1650s.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Coal Traffic in 1957

South African Railways transported 25,096,932 tons of coal from collieries by rail in 1957, 167,608 tons more than in 1956. This increase was recorded in spite of the movement of some 3,000,000 tons of coal by road from the Eastern Transvaal coalfields to the Witwatersrand and Pretoria areas, indicating a steady and substantial increase in coal consumption.

The railways carried 20,663,212 tons from Transvaal and Free State mines, 243,019 tons more than the previous year, and 4,433,720 tons from Natal mines, 75,411 tons less than during 1956.

Proposed Fieldsview-Macfarlane Line

The proposed new line connecting Macfarlane, on the main line between Kimberley and Warrenton and Fieldsview, on the Sishen branch line, will be seven miles long. The purpose of the line is to shorten the haul of freight traffic from the Postmasburg area to the north by 25 miles, and to relieve the existing line from Postmasburg. It is expected that construction will be completed within a year and the cost is estimated at £313,992.

The present rate of traffic, *en route* to the Transvaal, is approximately 6,000 tons a day, consisting mainly of limestone, iron ore, and cement. At present much of this traffic is diverted via Bloemfontein, but after completion of the new line the traffic will be taken directly through Klerksdorp.

EAST AFRICA

Mechanical Handling Equipment

A fleet of three-wheel mechanical horses and semi-trailer vans has recently been placed in service by E.A.R. & H. The 26 Scammell Scarab models, with six-ton semi-trailers manufactured by Scammell Lorries Limited, of Watford, are being used to operate a new goods and parcels delivery and collection service.

They will be used at Kampala where the road services have been unable to cope with a mounting volume of goods and parcels in their sheds.

The scheme is in the nature of an experiment and according to its success it will then be decided whether to extend it to other towns. A similar service for parcels traffic only is operated by E.A.R. & H. in Dar-es-Salaam.

INDIA

Bhilai - Dhalli Rajhara Branch

Construction of the 53-mile broad-gauge line of the South Eastern Railway to connect the Bhilai steel project with the mineral rich Dhalli Rajhara hills is making good progress.

The new branch, which traverses through the Durg district of Madhya Pradesh is being constructed primarily for transporting iron ore to Bhilai. It will also open up the rich country into extensive unlimited but untapped natural resources, and is expected to carry 3,000,000 tons of traffic a year.

There are 154 minor and 13 major bridges on the route, including five 100-ft. and two 40-ft. girder bridges across the Tandula river. All the bridges, excepting the Tandula river bridge and a few minor ones, have been completed. The track has been linked up to about 35 miles.

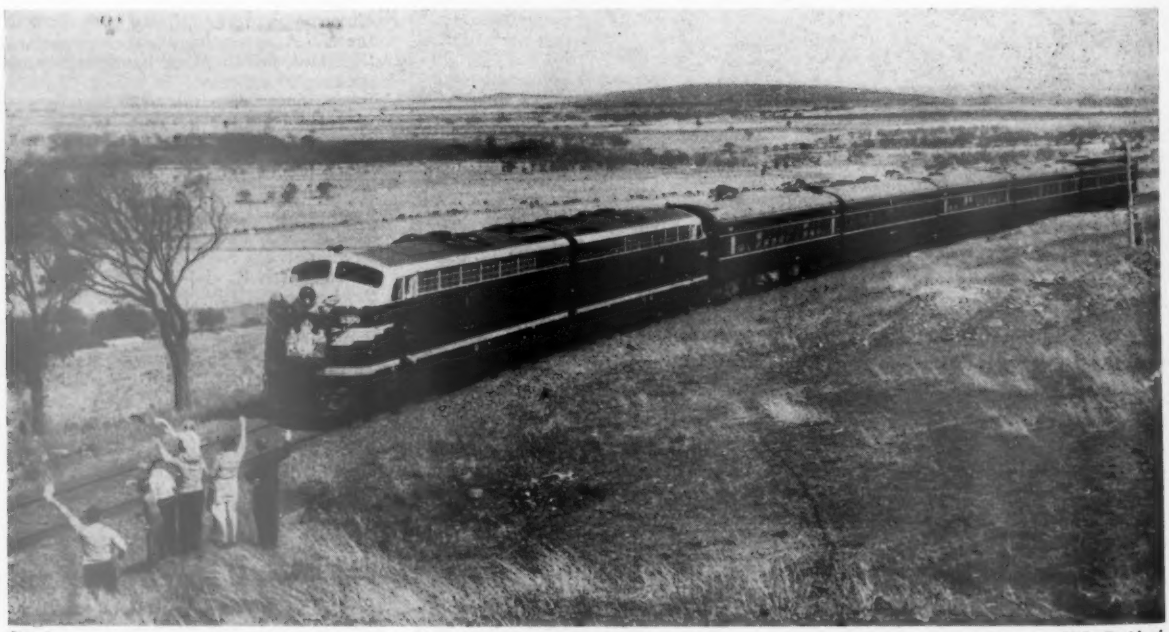
VICTORIA

Tenders for Richmond Station

Tenders have been called by the Victorian Railways for the construction of a two-storey station building at Richmond. The ground floor of the

Royal Journey over Victorian Railways

(see our March 14 issue)



Photo] *[John Buckland*

The train conveying Queen Elizabeth the Queen Mother from Melbourne to Ballarat on March 2, ascending the Ingliston bank, 13 miles at a ruling gradient of 1 in 48-50, between Bacchus Marsh and Ingliston

new station will have provision for six shops facing a busy thoroughfare. The tracks through the new station are to be above ground level and the booking and parcels office will be on the first floor, access being by means of a ramp and a stairway.

Included in the station building will be a room suitable for leasing as a club or professional premises. The building will be of concrete, with a flat roof, and located slightly to the west of the present station. Partial demolition of the latter, which is 73 years old, has already taken place.

Healesville and Warburton Lines

Healesville and Warburton are two of the nearer country tourist resorts beyond the eastern suburban area round Melbourne and are served by separate lines worked from Lilydale, the end of the outer suburban electric line.

Services beyond Lilydale were formerly run by steam and sometimes consisted of mixed trains. Last October an experiment was made in substituting a diesel railcar for passenger services between Lilydale and Healesville and increasing the number of trains from two each way to four. The new timetable provided a day return trip to Melbourne for Healesville and district business people and a train enabling women to travel to the city for shopping and so on and return at a convenient hour.

One-Class Suburban Services

The State Government is reported to favour in principle the adoption of one class only for Melbourne suburban services, though such a step at present is impracticable, as it would result in fares higher than the existing second class, though lower than the first class fares.

Two increases in fares since 1952 have caused a substantial swing from first class to second class travel on suburban and country lines. The change to second class has been more pronounced on suburban than country lines. This trend, the comfort of the second class accommodation in the newer multiple-unit electric trains, and the reduction in operating costs resulting from providing one class of coach, are stated to be factors in favour.

SOUTH AUSTRALIA

Gauge Conversion

Conversion from 3-ft. 6-in. to 5-ft. 3-in. gauge of the Naracoorte-Kingston branch is proceeding and has been completed from Naracoorte to Lucindale, 21 miles, where a mixed-gauge yard has come into operation. The old narrow-gauge yard has been abandoned. Other lines so far completed are those from Wolseley to Mount Gambier and from Mount Gambier to Millicent.

The Millicent-Beachport section and the Wandilo-Glencoe branch, both of which were formerly worked from Mount Gambier, have been closed. Conversion of the Naracoorte-Kingston branch is the last stage of the project.

DENMARK

Sugar Beet Traffic

In 1957 the State Railways were faced with the task of moving sugar beet to factories in Western Germany in the Hanover and Brunswick areas. Movement was involved of 410,000 tons from nearly all stations in Jutland and Funen, and it was completed between September 22 and December 22, but in the last three weeks the traffic was small.

A large number of wagons was earmarked, and the turnround was calculated at seven days. Six collecting stations were designated, where the wagons were weighed and sorted.

Beets were transported in 675 special trains, and the maximum number of loaded wagons sent per day was 540. In all 20,774 loaded wagons were despatched.

POLAND

Electrification

During the current year, 500 miles of line are to be electrified. There is a possibility of an increase in this mileage. Offers are being considered from firms in other countries of electrification equipment on credit terms.

Major electrification projects include the Katowice-Szczakowa-Cracow-Podleze line, which means that by 1959 the Warsaw-Cracow route via Czestochowa will be electrified throughout for passenger and freight traffic. Work in progress in Silesia includes the Katowice-Strzelce Opolskie-Wroclaw; the Katowice-Ligota-Tychy and the Katowice-Muchowiec-Zawiercie lines.

The first completely Polish-built electric locomotive, of the "E06 Pafawag" freight class, has gone into regular service. It has six electric motors, can attain 65 m.p.h., and can haul a maximum load at a cruising speed of 45 m.p.h.

Publications Received

British Railways Pre-grouping Atlas and Gazetteer. Hampton Court, Surrey: Ian Allan Limited, Craven House. 9¾ in. × 7 in. 84 pp. Spiral binding. Price 21s.—Thirty-five years have passed since the grouping of 1923 simplified the railway map of Great Britain, but the names of companies that had been so long familiar still linger. This atlas shows the railways of the country as they were before that change, and also provides an up-to-date picture of British Railways, if allowance is made for lines and stations that have been closed. The various systems, and the lines still in private ownership, are shown in distinctive colours to a scale of approximately eight miles to an inch, although no indication of this proportion appears to be given. There are also enlarged maps of complicated areas. The usefulness of the work has been enhanced by the inclusion of features such as locomotive works and sheds, water troughs, and principal summits, viaducts, and tunnels. These details are listed in separate indices from the alphabetical gazetteer of stations and junctions.

Coburn Sliding Door Gear.—The latest catalogue of some 160 pages, published by Coburn Engineers Limited of Peasmarch, Guildford, Surrey contains full information on its range of equipment for sliding and folding doors. The most recent designs of door gear are described. Copies of the catalogue may be obtained on request to the manufacturer.

Hydraulic Clamping.—A brochure has been issued by Power Jacks Limited, Maylands Avenue, Hemel Hempstead, Herts, describing the range of Newton hydraulic clamping equipment. It also deals with the theory and practice of hydraulic clamping and gives examples of typical applications. Copies may be obtained from the company on application.

Claytonrite Flexible Couplings.—This leaflet deals with the range of Clayton and Harrisflex flexible couplings manufactured by Howard Clayton-Wright Limited, Wellesbourne, Warwickshire. The principle of the flexible bearings is the pressure bond plus chemical bond of rubber on metal. The publication describes the construction and application of the couplings as well as giving complete dimensions and capacities of each size.

Bestobell Globe Valves.—A brochure has been prepared by Bell's Asbestos & Engineering Limited, Bestobell Works, Slough, Bucks, which describes the company's range of globe valves. Copies of the publication are available from the manufacturers on request.

Holidays on the Continent.—Seven attractively produced booklets give details of the great variety of holidays arranged during the coming season by Thos. Cook & Son Ltd., and by Dean & Dawson Limited. They are devoted to holidays in Austria; Belgium, Holland, and Luxembourg; France; Germany; Italy; Scandinavia, Iceland, and Finland; and Switzerland. Some of the charges are extremely moderate in view of prevailing prices in the countries concerned, which shows what can be achieved by efficient organisation. The pleasing coloured covers evoke the charm and beauty of the holiday resorts listed within.

Seventeenth International Railway Congress

Planning Services for Electric and Diesel Traction

Five timetable principles to which new forms of motive power make useful contributions

IN view of the increasing trend towards electrical and diesel traction in many parts of the world, one of the subjects to be considered by the International Railway Congress Association at its Madrid session this year is the general structure of railway passenger services. This is the subject of Question 6 on the agenda, which has asked for research into the principles conducive to a rational and efficient organisation of passenger train services when changing over to electric and diesel traction.

Mr. G. F. Fiennes, Line Traffic Manager, Great Northern, British Railways, Eastern Region, is the reporter for the English-speaking countries, those with British associations, or where British practices largely prevail. He has studied the principles of a rational and efficient passenger service under the five heads of convenience, reliability, speed, comfort, and cheapness.

Convenience of Service

There is emphasis on night travel for the longer journeys. Departure times of the two express trains run by the New Zealand Government Railways between Auckland and Wellington are arranged so that the greater part of the journey is made at night and passengers reach their destination early the following morning. Japan, on the line from Tokyo to Osaka, runs 10 out of 19 limited or express trains through the night; in Britain, between London and Edinburgh, there are six by day and six by night.

For journeys up to 6 hr. Sweden epitomises the general feeling by assuming that the return journey can be made by day in the same day. Britain suggests that the traveller should be given 4-6 hr. for business and recommends avoiding departures too early in the morning and arrivals too late at night. The reporter quotes a contrary view from Norway, where in the schedules of two trains a late departure has been preferred and arrivals at 10.45 p.m. and 11 p.m. are considered acceptable. British experience is quoted to show how the margin for catching local connections may have an influence in this respect, for the "Talisman," arriving at Edinburgh at 10.40 p.m., is stated to be considerably more successful than the "Caledonian," reaching Glasgow at 10.55 p.m.

An outward and return trip in one day is generally disregarded for journeys of over 6 hr., but a total outward journey of 16 hr. is possible, and Sweden, India, and Japan either already undertake or recommend such journeys. While journeys of between 6 and 11 hr. allow the traveller to occupy the forenoon in business and still reach his destination at or before 11 p.m., maximum times under 11 hr. are recommended by Britain, Japan, and India (10 hr.), Sweden (9 hr.), and Egypt and Norway (8 hr.). Mr. Fiennes suggests the likely conclusion that there is a field for the further development on the lines adopted by Norway, Sweden, and Britain of high-speed services over long distances in the afternoon.

He then discusses the structure of timetables under the headings of group, continuous, and interval services. In general, railways operating groups of trains do so to meet some major and often complex demand and channel the lesser demand into the service provided rather than trying to meet such demands within a short time of their arising. Continuous services, spread throughout the day, are confined to Egypt (Cairo-Alexandria), Britain, and, as a marginal case, Japan. Interval services are defined as those in which a series of trains spread throughout the passenger day is timed throughout the journey at an even interval after each hour. They exist, as far as this report is concerned, only in Britain, and then only if trains running between 50 and 60 miles are regarded as a main-line service. Even-time departure services exist in Britain only.

Suburban services are characterised by rigidity, heightened by the fact that the season ticket holder will travel within a very few minutes of his set time in the acutest discomfort rather than catch a comfortable earlier train or delay his departure home. The situation is continually on the point of getting out of hand, as is shown in the British report: "Compared with 1939 the daily total of passengers travelling has increased by 7·7 per cent, largely due to the greater number of people in employment as the increase in the peak periods is 15 per cent whereas in the remainder of the 24 hr. there is a decrease of 4 per cent." It has been found that the most significant effect of electrifying suburban lines in North-East London is to heighten and sharpen the peak. The Japanese management reports running 30 ten-car trains in the peak hour on the Chuo Line and confesses to being at a loss to know how to increase speed and frequency further. Mr. Fiennes expresses surprise at the absence of a general attempt at interval services in suburban timetables, and also advocates more attention to a timetable structure which allows the maximum distance to be run without a stop.

With reference to seasonal services, he quotes demands on the railways varying from "the comfortable to the burdensome." India, Ceylon, Japan, and Britain are shown to have very sharp and high seasonal peaks. The British example given is the London to Paris service, with an increase up to nearly 700 per cent, six trains in the winter with 787 people becoming 26 in the summer peak with 9,000. To some seaside resorts in Britain with a winter demand of a few hundreds, up to 70,000 people demand transport on a summer day. It is true that of British Railways locomotive-hauled main-line coaches, half are required for use on only 20 days in the year.

Commenting on the structure of seasonal services, it is observed that in countries where Saturday is a day of leisure, it is possible to induce a fair proportion of people to travel on Friday evening and during Friday night. Britain also has had some small success in inducing people to travel in the middle of the week by reducing fares on Tuesdays, Wednesdays, and Thursdays.

It is considered preferable to publish in the timetables as many as possible of the extra seasonal trains, even though they may run only on a few days in the year. Seasonal traffics give the opportunity of concentrating people in train loads at the point of origin and running them non-stop to destination. Quite apart from the evident advantages to the passengers, it is nonsense on days of peak demand for rolling stock and line occupation not to take a step which increases the capacity of both. There are, the reporter remarks, far too many trains stopping at far too many stations all over the world.

Speed

In general the administrations replying to the questionnaire have not dwelt on speed for its own sake but have referred to it in other connections. For example, one reply mentions reductions in journey times after electrification, but comments that the basic reason for electrifying was the much lower operating costs and the greater number of coaches which could be hauled per locomotive unit. Another reply gives as reasons for a policy of acceleration only increased capacity of the line and increase in frequency of trains. On the other hand, Japan reports persistent efforts to speed up trains. Since the Tokyo-Numazu line was electrified in 1934, the timetable has been revised on more than 10 occasions in parallel with extensions of electrification. With the completion of the Tokyo-Osaka electrification, the time of expresses was curtailed by 30 min. and future researches into the possibilities of lightweight rolling stock are aimed at cutting down the time of the limited expresses on

the Tokyo-Osaka line from 7½ hr. to 6 hr. (57 m.p.h.). It is not usually possible to distinguish the effects of speed on volume of travel from those of accompanying improvements in frequency, convenience and comfort, but it can be shown that the faster service between two places is more attractive that the slower unless the latter has some other outstanding advantage.

Suburban speed is of even greater importance as the principal factor which can mitigate the overcrowding in the peak hours and the general tedium of the daily journey.

Generally it is true that with short distances between stations, the overall speed of trains is bound to be low, whatever the form of traction. The only method of ensuring the suburban passenger a fast service is by eliminating as many stops as possible on the way or, in other words, either omitting calls at certain stations or by grouping adjacent stations in trainloads of people. The peak hour service of the Eastern Region of British Railways, from Liverpool Street and Stratford to Shenfield, is quoted as an example of the latter principle, and here, apart from one all-stations train, average speeds range between 41 and 30 m.p.h.

Reliability

Failure in reliability implies wasted time for the traveller either by arriving late or by being led to catch an earlier train than should be necessary. It has a second drawback in that the fear of arriving late and the irritation at delays on the journey are probably the largest single component of fatigue in travel. The question of reliability versus speed was not included in the questionnaire, and the reporter states his personal opinion that in the extreme ranges where frequency and speed conflict with reliability, the most important principle is reliability.

Comfort

The administrations replying record significant progress in comfort of travel, although not necessarily as an adjunct of a change in method of traction. This is not the case, however, with suburban travel to the largest towns, where the cost of providing every passenger with a seat at peak hours is prohibitive. Efforts to spread the peak by staggering hours of work have been largely unavailing. The problem is chronic in the largest towns. In fact, the effect in London of a significant improvement in suburban service by a change of traction has been to intensify the high peaks and in a short time to render the problem more acute than ever.

For longer-distance journeys several administrations are introducing seats with adjustable backs for reclining, and in New Zealand these are provided on journeys of over an hour. Research is going on into the best design of normal seat.

A journey of 8 hr. seems the generally accepted minimum for sleeping car facilities, but these may be provided on shorter journeys when passengers have early access to them or are permitted to remain in the cars for a short time after arrival at destination. In these circumstances there are some sleeping car journeys of 6 hr. and less.

Replies to questions on methods of maintaining a reasonable temperature in rolling stock revealed that many old practices are dying hard and insulation against heat and cold as a specific project seems to have made little headway. There has, however, been progress with air-conditioning in Burma, Egypt, India, and Malaya among the tropical countries, Norway in the northern latitudes, and in Japan in the temperate zone. Vehicles equipped in this way are mainly sleeping and restaurant cars. In Japan, all sleeping, restaurant and observation cars are air-conditioned on the limited expresses and this will soon apply to all ordinary express trains on principal routes. In suburban travel, the Long Island Railroad in the U.S.A. is partly equipped with air-conditioned stock. Air-conditioning is extremely costly, and the reporter suggests that pressure ventilation combined with insulation of the vehicle may prove an acceptable alternative.

Although administrations generally are conscious of external conditions affecting comfort, there has been little progress in limiting the number of intermediate stops on sleeping car trains, with their attendant activities of changing engines, attaching or detaching vehicles, loading and unloading passengers, mails and goods, and so on. Night travel is the one instance where travel is not a waste of time. It should be developed as a social benefit. To give passengers uninterrupted rest is an end in itself.

The requirements of privacy are met by most administrations as far as practicable, in the first place by providing a combination of compartment and open stock, and secondly by two or more classes of travel. There is a strong trend towards open stock for short journeys and less strongly for longer journeys. In Britain the open saloons of the diesel multiple-unit trains have proved extremely popular, despite the often-expressed preference of the British traveller for compartments. It is generally true that the countries which in the past have settled for open stock show no sign of moving towards compartments, but the approach of the previously compartment-minded countries to open stock is more tentative. It is probably true that proper design of seating and attention to sound insulation and comfortable temperature can overcome most of the objections to open stock. It is noticed in Britain on trains with stock of both types that open carriages which are more attractively furnished are popular.

Two-class trains continue to be the rule on long-distance services; but India, Ceylon, and Ireland report declines in first class travel. The question arises whether the system of two classes should be preserved not so much by a difference in the standard of comfort but by giving passengers access to compartment stock on paying a supplement.

All administrations, except New Zealand, which allows time for refreshments at wayside stops, provide some refreshment service on long-distance trains. There is some trend towards a common class of dining car, and a tendency also toward a simpler service of refreshments but more widely spread over the timetable.

Cheapness

The principal movement costs of a passenger service are carriages, engine, crew and fuel. Some administrations have no regard to the use of rolling stock in the design of their passenger service, but there are exceptions such as the return London-Edinburgh journey made in a day by one set of carriages in a recent British timetable. Several administrations with group service show good records, such as 223 and 183 miles a day by two Pacific locomotive classes in India; Burma with 153 miles; Norway with 190 miles by electric locomotives and 202 miles by multiple-unit trains. Experience in Britain shows that an even-time or interval service, properly planned, can be the cheapest to operate per train-mile. Increases in maximum speed often involve large expenditure on track and motive power, and smaller expenditure on fuel. It is Mr. Fiennes' experience that where fuel only has to be thrown into the scale, higher overall speed is almost always an economy. Comfort may be a very expensive amenity and administrations can only hope to recoup themselves by an increase in the travel habit.

Conclusions

In summarising the conclusions set out above, he refers to the special qualities of diesel and electric traction in operating services of the types discussed. The capacity of diesel and electric locomotives to work virtually without intermission gives them a clear advantage over steam, especially in suburban work, and in areas where engines released from passenger service can be used on freight trains. In the matter of frequency, the advantages of multiple-unit stock, especially for suburban service in reducing the number of movements at terminals and in greater acceleration on the road, gives diesel or electric traction a clear preference. These forms of motive power also lend themselves to long non-stop runs by their ability to travel long distances without attention, while their rapid acceleration and sustained uphill speeds over virtually indefinite distances contribute both to overall speed and reliability of service. They may also be the final answer to the problem of providing sufficient power for ventilation and heating of trains, while they inherently solve most problems of cleanliness. Conversion to these methods of traction facilitates the planning of timetables with use of rolling stock as a prime consideration.

Western Region Diesel Services

Area-by-area main-line conversion schemes are being initiated; and existing profitable railcar area workings extended

Birmingham to Swansea diesel-mechanical inter-city train leaving Cheltenham Malvern Road

FAR-REACHING proposals for the conversion to diesel operation of almost the whole main-line system have now been drawn up in some detail by the management of the Western Region of British Railways; and a beginning is to be made to implement these with the introduction of the first few main-line locomotives scheduled for delivery over the next three or four months. Additional to these schemes the Western Region already has three groups of railcar services in operation which have given successful financial results, and these also are likely to be extended, as is the use of diesel shunting locomotives.

It may be remarked that as far as line-service diesel locomotives are concerned, the higher management of the Western Region decided that only diesel-hydraulic designs should be acquired, though standard B.R. diesel-mechanical railcars and standard B.R. 400-b.h.p. diesel-electric shunters and 204-b.h.p. diesel-mechanical shunters would be used.

Line-Service Conversions

At an early stage the decision was made to effect the conversions area by area, so that the full benefits of diesel traction could be obtained as early as possible. The first area selected was that west of Newton Abbot and known as the West of England, or No. 1, area. Actually all motive power stationed at Newton Abbot depot is also to be diesel, so that in addition to the locomotives in the far west, Newton Abbot diesel locomotives will also be operating main-line passenger and freight trains to London, Bristol, and even Hereford, as the present Newton Abbot steam locomotives do. All lines west of Newton Abbot are to be operated by diesel locomotives, railcars solo or in multiple, and shunting done by diesel units.

This scheme involves the provision of 72 locomotives of 2,000 h.p. and 58 of 1,000 h.p., as well as numerous railcar sets. Five locomotives of 2,000 b.h.p. are already in course of delivery from the North British Locomotive Co. Ltd., and six of 1,000 b.h.p. are to follow. Swindon works is now completing three locomotives of 2,000 h.p. Orders placed during the last four months include 30 units of 2,000 h.p. to Swindon works and 52 of 1,000 h.p. to N.B.L.; and a further 34 units of 2,000 b.h.p. are to be ordered shortly.

Second of the areas selected for conversion to full diesel working is Bristol (area No. 2), for which something like 200 diesel-hydraulic locomotives of 1,000 and 2,000 h.p. will be required. Then in sequence are to come area No. 3 (South Wales and Gloucester), and area No. 4 (London-Birmingham-Chester). Supplementary to these, and to be introduced at a much earlier stage, probably 1959, are three 2,000-h.p. eight-car diesel-electric Pullman trains for Paddington-Bristol and Paddington - Birmingham - Wolverhampton fast services. These are simply three of the handful of eight-car and six-car sets built to B.T.C. order for trial on the L.M.R. and W.R. special services. Four of the recent 150 b.h.p. two-axle diesel-mechanical railbuses with 46 seats are also being put into traffic now, at first on the Kemble-Cirencester and Kemble-Tetbury branches; and in both cases additional halts are to be provided to give better facilities and attract more traffic.

Inter-City Service

The Western Region's forerunner, the Great Western Railway, began accelerated services between Birmingham, Newport and Cardiff as long ago as 1934, using triple-car diesel trains made up of two railcars and an intermediate trailer, and this service ran for many years. On June 17, 1957, it was resuscitated, using new railcars of the so-called inter-city type (see our issue of August 3, 1956) built at Swindon works. There are 18 cars, two with buffets, in this pool, and the service has been extended westward to Swansea, using the same route via Newport and Cardiff from Birmingham. The railcars are serviced and maintained at Cardiff (Canton) and Birmingham (Tyseley) depots. Commercial results have been encouraging. In the first four months of the service passenger bookings increased by some 163,000, equivalent to almost 16 per cent, and receipts by £30,000 (29 per cent) compared with the corresponding period in the previous year; but there was an indication that some of the increase was at the expense of the alternative route via Hereford.

Suburban Services

At the moment the suburban areas where the passenger traffic is operated by diesel railcar formations of B.R. standard types are two in number, namely Birmingham and Newport.

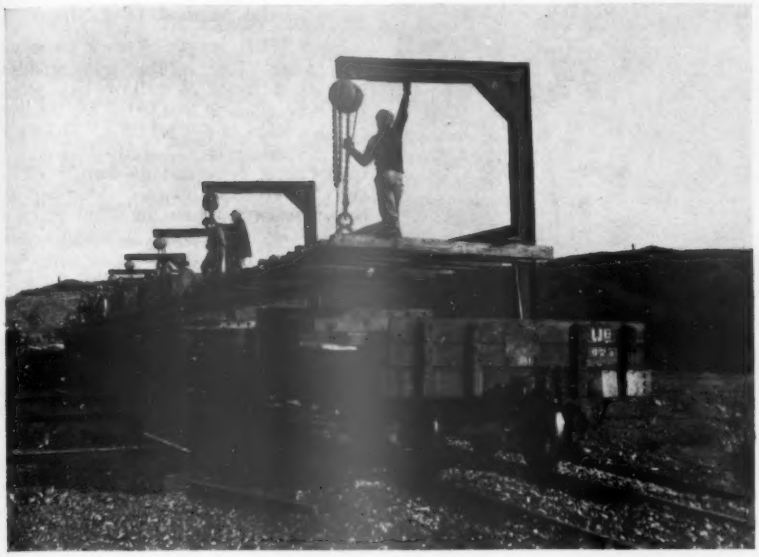
As with the Birmingham-Cardiff-Swansea inter-city railcar service, the W.R. Birmingham suburban services were turned over to diesel railcar operation on June 17, 1957; and the whole of the local and suburban passenger trains, including some longer turns out to Worcester, Oxford, and even Didcot, are now so operated, by a pool of 107 railcars, of which 99 normally operate in triple-car formations, and eight are single-unit cars including one or two parcels and light freight cars. This last-named group largely replaces old G.W.R. diesel railcars built over the years 1934-1940. Of the 99 railcars working as triples, 87 are of the B.R. standard 63½-ft. suburban type built at Derby works; and 12 are of 63½-ft. standard cross-country type built at Swindon works. These railcars are all maintained at Birmingham (Tyseley) depot, but additional fuelling and servicing points have been erected at Leamington, Wolverhampton Cannock Road and Stourbridge.

Commercial results are considered to have been satisfactory, and during the

(*Continued on page* 422)

Rail Welding and Methods of Laying in New Zealand

Machine-welding depot: pre-fabricated track-laying in Rimutaka Tunnel



Lowering a 351-ft. length of welded track at Mangaroa pre-fabrication depot

THE construction of the 5½-mile Rimutaka Tunnel on the direct Wellington-Masterton-Hawkes Bay line of the New Zealand Government Railways in the North Island, described in our issues of May 27 and June 10, 1955, was completed and handed over by the contractors to the railway administration on February 1 of that year. To bring the 15·4-mile realignment, on which the tunnel is situated, into service, there then remained the completion of the nine-mile approaches to the tunnel, including a crossing loop at each end of it, and the track-laying throughout. To expedite the latter and reduce future maintenance it had been decided to use long welded rails (*a*) in 351-ft. lengths of pre-fabricated track in the tunnel, and (*b*) in 117-ft. or 126-ft. lengths for the approaches.

As mentioned in an editorial note on another page, this policy tended to hasten the establishment of three central rail-welding depots distributed over the railway system, the first of them located at Woburn, near Lower Hutt, on the Wellington side of the tunnel. This depot supplies the southern part of the North Island centred upon Wellington, and the other two are at Otahuhu (Auckland), and at Middleton, near Christchurch, in South Island.

Woburn Machine-Welding Depot

The Woburn depot was carefully planned for convenient working and rapid production; with its arrangement of storage racks it occupies a site of about 1½ acres. Rails imported from overseas are unloaded from wagons on to inward storage racks by overhead crane, rails damaged in transit being sorted out for subsequent straightening. The straight rails pass along a roller-conveyor to a second rack outside the welding shop. Another conveyor carries the distorted rails to a power-operated straightening machine; after straightening, they rejoin the other rails.

A third roller-conveyor feeds the welding bay from the second storage rack. In the welding shop are two British-built machines, a flash-butt electric welding machine and a post-heating machine. The rails are first fed into the welding machine and the two ends to be welded are lined up under the electrodes, air-hydraulic aligning rollers holding both rails in position. The machine is started by pressing a button and the rest of the process is automatic. The rails are brought together intermittently for heating until after about 2 min. their ends have become evenly heated, when they are finally brought together with a force of 30 tons; this completes the weld and the machine automatically switches off.

The welded rails are released from the clamps by press-button and pass along the conveyor for the removal of excess metal by a pneumatic chisel. As the weld is harder than the rails, it is then fed into the second complicated machine, the post-heating machine, to be softened by heat.

Post-Heating Machine

In this machine the rail on each side of the weld is held between two elements carrying a high amperage and low voltage, and is heated until it becomes cherry-red. Two photo-electric cells measure the heat by the colour of the metal in the head and the base of the rail, and automatically switch off their respective elements when the desired temperature is reached. A roller-conveyor takes the completed 117-ft., 126-ft. and 351-ft. rail lengths to the final storage racks ready for subsequent loading on flat wagons for railing to site. Like the others, this plant has a capacity of 50 welds a day, sufficient for a ¼ mile of track, using American 90-lb. A.R.A.-type rails.

At Woburn the rail lengths were loaded 24 at a time in two tiers on to

The first 351-ft. length of pre-fabricated welded track on flat wagons about to enter the tunnel and be picked up by gantries, one of which is seen in the tunnel portal

This length of track has been hauled forward by tractor and lowered on to the tunnel floor, before temporary fishing up and subsequent thermic welding of joints ; note rails for gantries fixed on concrete floor

the rake of wagons. In transit they proved sufficiently flexible to cause no trouble even on the sharpest curves. The 117-ft. and 126-ft. lengths were railed direct to the various laying sites, but the 351-ft. lengths were unloaded at Mangaroa, at the Wellington end of the tunnel, where a special temporary depot was established for assembling complete pre-fabricated sections of track of that length.

Special Method of Laying

Each 351-ft. length of track complete and ready for laying was skidded beneath a series of gallows-like hoists spanning a siding and lifted for loading on to a train of flat wagons. The train was pushed up to and gradually into the tunnel as it deposited its own track to run on, in the manner described in detail below. When the train reached the last length of track previously laid, the track-length it was carrying was lifted by a series of transverse gantries spanning almost the full width of the tunnel and running on rail 8 ft. 10 in. apart, previously fixed to the concrete during the flooring of the tunnel.

When the train had been withdrawn from under it, the track-length it had been carrying was lowered almost to the already-laid track below it. In that position and still supported by the gantries—now stiffened by the addition of a horizontal cross-frame—the pre-fabricated 351-ft. length of track was hauled forward with the gantries by a diesel tractor until it could be lowered on to the floor and be fished up with the leading end of the previously-laid track.

The bolting-up of these joints, however, was only temporary, as they were subsequently thermit-welded to form track-lengths up to a mile long between insulated bolted joints that had to be retained for signalling purposes.

Western Region Diesel Services

(*Concluded fro.n page* 420)

first four months of diesel operation the number of passenger bookings rose by 360,000, equivalent to 28 per cent over the corresponding period of the preceding year, and the receipts rose by £32,700, or 22½ per cent; but some of this increase should be attributed to a provincial bus strike within the period and to an all-round increase in bus fares. Nevertheless, diesel railcars and regular-interval services are proving to be means of recapturing local and suburban passenger traffic.

The present South Wales diesel-operated services comprise the majority of those to and from the Eastern and Western valleys; that is, between Newport and Blaenavon, and Newport, Brynmawr and Ebbw Vale Low Level. This group of services was introduced on December 2, 1957, and is worked by 10 three-car Derby-built sets having only one class of accommodation. At the present time an extension is being made in South Wales by the introduction of diesel services in the Cardiff suburban area; and later this year further extensions are to be inaugurated in this district, in other parts of Glamorganshire, and around Bristol. An alternative Birmingham-Cardiff railcar service is also to be given over the Hereford route; and a few single-unit cars are to be put into traffic in the outer London area

PAPER TOWELS IN RAILWAY SERVICE.—A recent demonstration by Kimberly-Clark Limited showed the versatility of that company's paper towel products. These are made from pure Kraft paper with resins added. The range includes Hi-Dri Paper Towels, the industrial roll, folded individual and double-width types, Kleenex paper squares and medical wipes. Their high and rapid absorbency combined with hygienic and non-fluff qualities make them suitable for railway use. The fact that there are no laundering costs and that the towels are not liable to pilferage add to their advantages. Dry, they make excellent towels, and their great strength when wet permits their subsequent use as dishcloths and, later, as floorswabs. The products are already being supplied in large quantities to the British Transport Commission, British Railways, the London Transport Executive, and other transport undertakings. Their non-fluffing quality makes them suitable for cleaning all glass surfaces. Kimberly-Clark Limited offers a free Hi-Dri installations service; this includes the supply of dispensing cabinets in Great Britain. The company will recommend the best type of towel for specific need. After installation, regular servicing and a continuous supply of paper towelling is undertaken. Kimberly-Clark Limited is a British company, associated with the American corporation of the same name and with the Reed Paper group. Offices are at 11, Grosvenor Gardens, London, S.W.1.

PAXMAN ENGINES IN THE SCOTTISH REGION AND NEW SOUTH WALES.—In the period between September 1955 and January 1956 five Paxman engined 200-h.p. locomotives were placed in service in the Scottish Region of British Railways. These engines have now averaged over 8,000 hr. service; the first major inspection is scheduled at 13,000 hr. Over 1953-54, the New South Wales Government Railways took delivery of 10 Bo-Bo twin-engined 1,000-b.h.p. diesel-electric locomotives. Reports at the close of 1957 show that these engines have accumulated 223,000 hr.

SMALL TOOLS AT THE BRUSSELS INTERNATIONAL EXHIBITION.—A display of tools by James Neill & Co. (Sheffield) Ltd., makers of the Eclipse range of tools, will form part of the stand arranged by the Birmingham Exchange & Engineering Centre. This will include hack saw blades and frames, engineers' hand and precision tools, Eclipse tool bits, cutting-off tools and boring bars, and items in which permanent magnets are incorporated.

ELECTRIC RAILWAY TRACTION SECTION

New Era in Electrification in India

WITH the inauguration of electric working from Howrah to Sheoraphuli on December 14 last, referred to in our December 20 issue, electrification in India is entering on a new phase. Electrification on a wide scale is essential to meet the transport requirements of the Second Five-Year Plan. The former Great Indian Peninsula Railway electrified its main lines from Kalyan to Poona and Igatpuri in 1929-30 at 1,500 V. d.c., to meet operating conditions of the ghat sections, where electrification enabled a reversing station to be dispensed with and goods trains of up to 1,200 tons to be hauled on a ruling gradient of 1 in 37, on which steam traction division had been necessary.

Today, however, the demand for greater traffic capacity on the main lines in general justifies electrification. Mr. S. Sarangapany, General Manager of the Eastern Railway, has described in an article in a special issue of *Indian Railways* the schemes authorised in 1954, totalling 1,300 route-miles, as "the absolute bare minimum mileage to be electrified to enable the railways to carry the Second [Five-Year] Plan traffic." These schemes comprise completion of the Calcutta suburban electrification, also Burdwan to Moghalsarai, Asansol to Rourkela, Igatpuri to Bhusaval, and, on the Southern Railway, Tambaram to Villupuram. All these conversions are to be at 25 kV., 50 cycles. The total estimated cost is about Rs. 12 crores.

The need for co-ordination between electricity supply authorities and the railways is also stressed, so that transmission lines for traction supplies may contribute to general electrification in rural areas. The present section of the Calcutta scheme takes power from the Damodar Valley Corporation system, but the Burdwan-Moghalsarai section will depend on the Rihand power project, which at the moment is liable to cuts in authorised expenditure. Consideration of its importance to the railway, it is suggested, may lead to a restoration of priority, and Mr. Sarangapany sees justification for capital expenditure in the Second Plan on a grid system linking the Damodar Valley, Rihand, and Hirakud power projects to ensure supplies for the Eastern Railway schemes already authorised and for electrification on the South Eastern Railway between Khargpur and Waltair, which he thinks cannot be long delayed. Such considerations become of special importance now that single-phase traction at 50 cycles has been decided on, for, as is pointed out in an article in the same issue by Mr. L. N. Mathur, Director, Electrical Engineering, Railway Board, avoidance of unbalance on the supply system depends on the existence of a strong power network. Without careful planning of power supplies at this stage, trouble might be experienced when electrification moved away from the more highly industrialised areas.

There is a natural desire in India to undertake the manufacture of electrical equipment for new motive power and fixed installations. Some 15 per cent of the equipment for the Howrah-Burdwan section has been manufactured in the country by the Associated Electrical Industries Manufacturing Co. Ltd. to designs of the Metropolitan-Vickers Electrical Co. Ltd. An article by Mr. R. Subramanian of Associated Electrical Industries (India) Private Limited, refers to a substantial and welcome saving in foreign exchange achieved in this way. The A.E.I. group has contributed largely to the electrification, the substation rectifiers and switchgear having been supplied by the British Thomson-Houston Co. Ltd., and signalling equipment by Metropolitan-Vickers-G.R.S. Limited through Associated Electrical Industries (India) Private Limited, while traction equipments for 36 motor coaches and 68 trailer coaches are being manufactured by the Metropolitan-Vickers Electrical Co. Ltd. The locomotives with which services are being operated at present were built by the English Electric Co. Ltd., as described in our December 20 issue.

Indian engineers have had long experience of British-built d.c. traction equipment, the first electrified section having been opened in 1925 between Victoria Terminus, Bombay, and Kurla *via* the Harbour Branch, and operated with multiple-unit trains equipped by the English Electric Co. Ltd. When the G.I.P.R. electrified to Igatpuri and Poona, passenger and goods locomotives were supplied by the Metropolitan-Vickers Electrical Co. Ltd. The former have been working the "Deccan Queen" express between Bombay and Poona for 28 years, supplemented today, of course, by the 3,600-h.p. English Electric locomotives described in our issue of February 18, 1955. New problems arise with the adoption of 50-cycle traction, and the fact that in this country the British Transport Commission is using certain specialised equipment of Continental design emphasises the value of continuing exchange of ideas and experience.

Comfort and Speed on the Paris-Lille Line

ON previous main-line electrifications in France, locomotive-hauled trains have been formed at first of existing steam stock. For the forthcoming Paris-Lille conversion, however, which is at 25 kV., 50 cycles, new vehicles of special types are being built for use in five-coach sets which will operate on a service making the 160-mile journey between Paris and Lille four times daily in 2 hr. 10 min. Each set will consist of three special vehicles and two new first class coaches of standard type, all of which will be of stainless steel construction and will be built by the Etablissements Carel-Fouché. Centre-corridor accommodation will preponderate, the three special designs being of this type; but the two standard firsts will have separate compartments. In the special stock the individual seats will have two-position reclining backs and adjustable headrests. Portable tables will be erected between the seats for the service of meals, which will be prepared in a kitchen section of one of the vehicles. Another coach will have a bar section, and a telephone cubicle from which it will be possible to make calls to, or receive them from, any subscriber in France. A loud-speaker system available to the bar attendant and the travelling ticket inspector will operate in all coaches. General lighting will be fluorescent, supplemented by individually-controlled reading lights. When the main lighting is off, the centre corridors will be lit at intervals by lamps at floor level for the guidance of passengers passing through the trains.

These various amenities will provide a practical test of the contention that open stock is as popular for main-line journeys as compartments if it offers something special in appointments and accommodation. There is little doubt that the standard of comfort, the speed of the journey, and the times of the four departures in each direction will prove attractive to business travellers, although it may be asked whether on a journey of only 130 min. there will be a sustained demand for telephone service.

New 50-cycle electrifications such as the Paris-Lille scheme are making it necessary to build more Bo-Bo locomotives developed from the original rectifier design for the Lille-Basle line. The first of a new series of 51 has run tests recently between Strasbourg and Charleville with a train of 22 passenger vehicles weighing no less than 900 tons. These were followed by speed tests between Strasbourg and Basle hauling 300 tons, in the course of which a maximum speed of 99·4 m.p.h. was reached and the overall average for the 88·2 miles was 85·75 m.p.h. The successful current collection at these speeds with the Faiveley pantographs is of interest in view of the adoption of this type for British Railways 50-cycle locomotives designed for a top speed of 100 m.p.h.

Electric Traction Section

Silicones in Traction Motor Insulation

Experiments with new insulating materials for future London Transport rolling stock

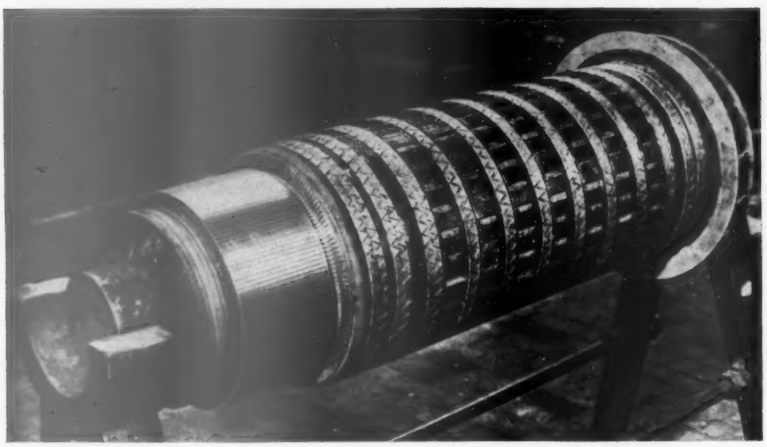
EXPERIMENTS are being carried out by London Transport in the use of silicone materials in place of mica based materials for the insulation of armature windings of traction motors and other equipment on the London Underground rolling stock. The results gained may help to prolong the life of armatures, giving the motors improved performance and reliability and economy of maintenance, and may eventually permit reductions in the weight and the cost of traction motors.

Most failures in traction motors arise from the thermal ageing of the insulation which leads to carbonisation and tracking. Silicone materials have been found to possess a much more stable chemical structure than organic insulating materials, and their decomposition, when it takes place, leaves no electrically conducting products. They are more able to withstand high temperatures and are less liable to thermal ageing. Their use appears, subject to large scale experience under actual running conditions, to offer substantial advantages in the general efficiency of traction motors. The ability of silicone insulation to withstand high temperatures may also permit a reduction in the size of a machine for a given output by enabling it to be run closer to the limit of its rating.

Experiments with silicone insulation in the form of taping and wrappers have been carried out by London Transport over a 10-year period and considerable advances have been achieved in their practical application to traction motor insulation. A number of traction motors insulated with silicone materials have been run for lengthy periods. During the experiments, steps were taken to provide abnormally arduous conditions with temperatures much higher than those at which motors normally run. The results are said to have been encouraging.

It has now been decided that a proportion of traction motors on new Underground rolling stock will be insulated with silicone materials and their performance will be studied in comparison with that of those insulated with the materials formerly standard. In addition, Metadyne machines used for traction control purposes in certain types of rolling stock are now all being rewound with silicone materials whenever this work becomes necessary.

In 1948 development work was started at the central railway overhaul works of London Transport to produce a satisfactory silicone insulated traction motor. The primary object of the test was to develop an improved form of insulation for existing and future traction motors and other rotating machines.



An LT.100 traction motor armature insulated with silicone bonded glass mica, and fitted with ventilating fan

The suitability of silicone materials as insulators at temperatures in excess of those permitted for Class "B" insulation showed the possibility of improving motor performance either by increasing the life of the armature windings or by obtaining a higher rating from an existing machine. A successful conclusion to the tests would also have its effect on the design of new traction motors.

Silicone Structure

A "silicone" is a silicon-organic compound based on a silicon-oxygen structure with hydrocarbon radicals bonded to the silicon atoms. Silicones can take many forms, but for electrical purposes the most important are the silicone resins and elastomers. These materials have similar properties to their organic equivalents, but they show a great chemical stability which makes them better able to maintain their properties over a wide temperature range. It is this feature which makes them of value as insulators for electrical machinery.

The traction motor selected for tests with silicone insulating materials was the LT.100 type. This machine, which was designed in 1938, is basically similar to the traction motors being designed today, and was chosen because of the large number in service. It is a 168-h.p. (one hr. rating), 600-V. four-pole machine. It has 31 armature slots, five conductors to each slot and is wave wound. The armature slot space factor is higher on this motor than on any other in service on London Transport railways, and this fact ensured that if silicone insulating materials were satisfactory on this type of machine, it would be possible to use them on other machines where the armature slot space factor is lower.

When the tests were started the only silicone compounds suitable for motor insulation were the silicone resins which could be used in place of organic varnishes in combination with woven glass and mica. For this reason the method of insulating the first motor for test was to substitute woven glass tape and silicone varnish for the paper and shellac which were used in the existing scheme of insulation. Three of the armature conductors were insulated with a half-lapped layer of glass mica tape bonded with silicone varnish, but to obtain the required armature bar dimensions it was only possible to apply a butted layer on the remaining two.

The earth insulation consisted of silicone bonded glass mica tape wrapped round all the conductors and this was retained by a half-lapped layer of white glass tape. At each stage of insulation the armature bar was painted with silicone varnish and finally it was pressed in a hot press to cure the varnish. The use of the hot press introduced production difficulties, which led to the abandoning of this method of insulation in favour of further tests on the then newly introduced silicone elastomers. One motor, however, was insulated in this manner and entered service in November, 1952. In December, 1953, it was withdrawn from service because the ventilating fan had broken and the opportunity was taken to return it to service without the fan so that the running temperature would be raised. This motor is still running in this condition and no defect has developed.

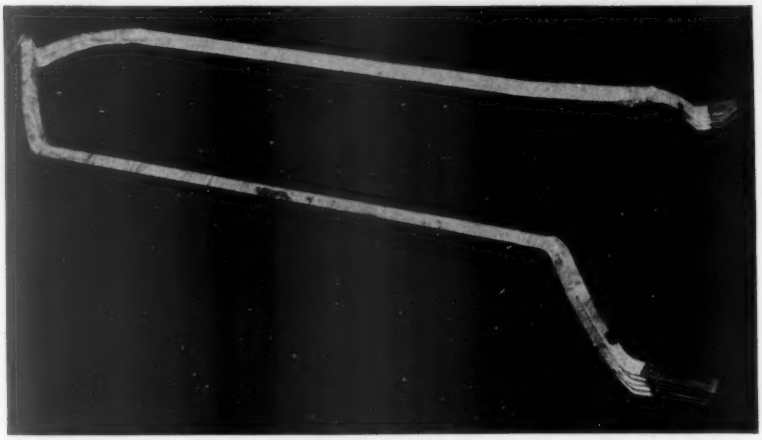
During 1952 semi-cured silicone elastomer materials were introduced into this country, and between 1953 and 1955

four LT.100 traction motors were insulated with these materials in combination with silicone-bonded glass mica tape. The insulation of these armature bars was silicone-bonded glass mica tape on the individual armature conductors and an outer layer of semi-cured silicone elastomer coated glass tape to act as earth insulation. This semi-cured elastomer was later cured in an oven to bond the layers of tape to form a sheath round the armature bar. The armature bar was completed by an outer wrapping of white glass tape which was afterwards varnished with a silicone varnish. Two of these machines were also fitted with field coils insulated with silicone-bonded flexible mica between the turns of the coil, and an outer wrap of semi-cured silicone elastomer coated glass tape, covered with a layer of white glass tape and finished with a coat of silicone varnish. The running temperatures of these two machines were raised by omitting the ventilating fan and blocking the armature core ventilation ducts.

Curing Operation

During manufacture of these armature bars it was found that on occasions the silicone elastomer failed to cure. Silicone elastomers require very careful temperature control during the curing operation; the later stages must be carried out in the presence of oxygen, otherwise the cure will be inhibited. It is necessary to use a two-temperature curing cycle—first at a lower temperature to initiate the cure and then at a higher temperature to complete the cure. If too high a temperature is used too soon, bubbling and sponging may occur. As some of the semi-cured materials are also sensitive to contamination by organic substances, their use presents production problems which are difficult to overcome without special equipment.

Early in 1956, one of the four machines which was insulated with a combination of glass mica tape and silicone elastomer failed with an armature insulation defect. Examination of the machine indicated that in spite of the severe arcing which had taken place at the point of failure, the surrounding insulation remained in good condition and showed no sign of carbonisation under the intense heat. Examination of the undamaged armature bars showed that the silicone elastomer had failed fully to cure, with a result that when the armature bar was fitted into the armature slot the silicone rubber had been reduced in thickness at the bottom corners. In addition there were indentations in the silicone rubber under the banding wire, due to the localised pressure at these points. It was considered that the reduction in the thickness of insulation at certain points, due to the plasticity of the incompletely cured silicone elastomer, was the cause of the failure and it was decided that the use of semi-cured silicone elastomer should be abandoned because of the difficulty of ensuring a proper cure under production conditions. Development work was, therefore, concentrated on the use of fully cured silicone elastomer tapes for the armature bar insulation. The remaining three which were insulated with semi-cured elastomer are still running satisfactorily.



An LT.100 traction motor armature bar insulated with silicone bonded glass mica tapes

By this time silicone adhesives were available and a fully cured silicone elastomer impregnated glass tape was developed which was coated with a thermosetting pressure sensitive silicone adhesive. A tap with the desired electrical and mechanical characteristics was produced as thin as ·006 in. and it was thought that this would be more suitable than glass mica tape for the insulation of the individual armature conductors. With glass mica insulation on the armature conductors there is a risk of the mica splittings fracturing at the sharp bends on the edges of the conductor, which reduces the di-electric strength of the conductor insulation at these points. By using a silicone elastomer tape, which is flexible and homogeneous, these difficulties are overcome and, also, the resilience of this insulation resists damage by vibrational and other stresses in service.

Because the minimum thickness of the silicone elastomer glass tape was greater than the thickness of the glass mica tapes used for the armature conductor insulation, it was only possible to insulate three of the five armature conductors; the remaining two were left bare. The earth insulation consisted of two half-lapped layers of silicone elastomer glass tape coated with a pressure sensitive silicone adhesive, and finally a half-lapped layer of white glass tape varnished with a silicone varnish. An armature insulated with this coil insulation entered service in mid 1957.

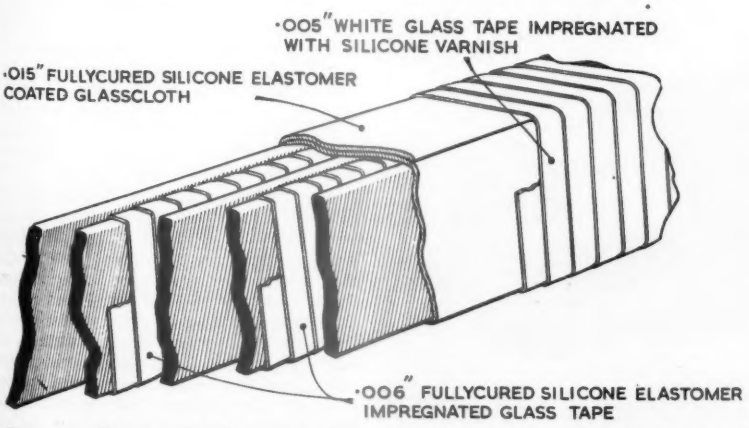

·005" WHITE GLASS TAPE IMPREGNATED WITH SILICONE VARNISH
·015" FULLYCURED SILICONE ELASTOMER COATED GLASSCLOTH
·006" FULLYCURED SILICONE ELASTOMER IMPREGNATED GLASS TAPE

Diagram showing the slot section of an LT.100 motor armature bar insulated with fully cured silicone elastomer glass tapes and slot wrapper

Laboratory Tests

A number of armature bars which were insulated in this way were submitted to laboratory tests designed to simulate the effects of centrifugal force and temperature. These tests, which were carried out in conjunction with Midland Silicones, Limited, and H. D. Symons & Co. Ltd., indicated that the bars were well able to withstand the mechanical stresses likely to be encountered under operating conditions;

A Metadyne regulator and exciter armature; the regulator (right) is insulated with silicone varnish bonded glass and mica

they were also heated to 200° C. for nine days and then to 330° C. for 25 hr., without ill effects.

Under high tension test it was found that breakdown of this system of insulation occurred to earth as a result of tracking across the adhesive layer. For this reason, and to utilise the available space in the armature slot to its full extent, it was decided to substitute a fully cured silicone elastomer impregnated glass wrapper for the tape which was previously used for earth insulation. This alteration more than doubled the breakdown voltage to earth. It means, however, that only two of the armature conductors can be insulated, leaving three bare. Twelve LT.100 traction motor armatures are being insulated in this way and, to distribute the pressure under the banding wire more evenly and to prevent local indentation of the insulation, strips of epoxy resin glass laminate are to be inserted between the armature bars and the armature bands. It may be possible, however, to obviate the use of the epoxy resin bonded glass laminate by the substitution of polyester resin bonded glass rovings for steel banding wire.

While experiments were being carried out with the LT.100 traction motor, it became necessary to re-wind a number of Metadyne machines, which are used for traction control on certain types of rolling stock, and more than 50 of these machines have now been re-wound with silicone insulation. At the time the decision was taken to use these materials, it was thought that the semi-cured silicone elastomers would give satisfactory service, and an armature bar was therefore developed using this material in combination with glass mica tape. In fact, this armature bar has given good service, in spite of the silicone elastomer failing to cure on occasions, because the armature has a tapered slot and slot wedges are used in place of banding, so that there is less tendency for the elastomer to be displaced under pressure.

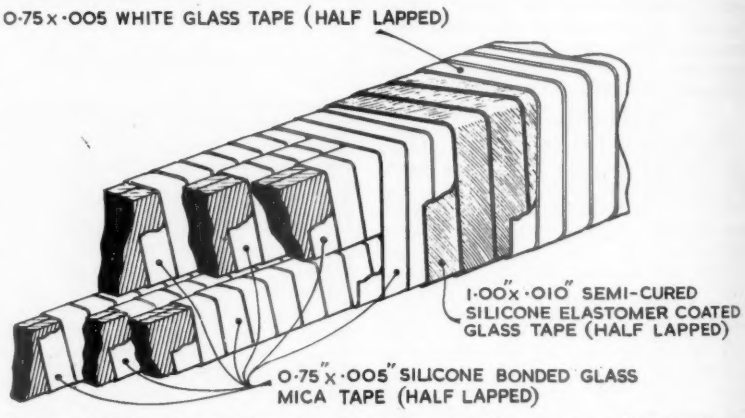

0·75 x ·005 WHITE GLASS TAPE (HALF LAPPED)
1·00" x ·010" SEMI-CURED SILICONE ELASTOMER COATED GLASS TAPE (HALF LAPPED)
0·75" x ·005" SILICONE BONDED GLASS MICA TAPE (HALF LAPPED)

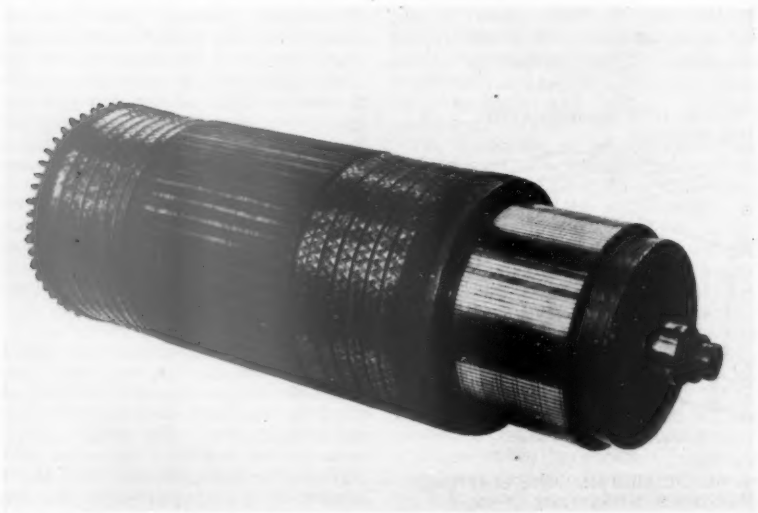
Diagram of the slot section of a Metadyne machine armature bar insulated with silicone bonded glass mica tapes and semi-cured silicone elastomer

Fault conditions

Under fault conditions, this type of machine can overheat and failures have occurred due to the solder melting in the commutator risers. No damage appears to have occurred to the silicone insulation under these conditions and a solder with a higher melting point is now used to prevent a recurrence of failure due to this cause.

The Metadyne machine also incorporates an auxiliary machine, known as a regulator, which is used for speed control. This machine is of a wire wound type, and under faulty conditions this also may overheat. It is now the standard practice to re-wind this machine with silicone materials, using glass-covered wire bonded with the silicone varnish. The earth insulation is silicone bonded glass mica and the complete coil is impregnated with a silicone varnish. The varnish used for impregnation is not a true silicone varnish but one modified by co-polymerisation with an alkyd resin.

The modified silicone varnishes are valuable for many applications where resistance to oils and solvents and high bond strength are important. Although the maximum operating temperature for a modified silicone varnish is lower than that of a true silicone varnish, and they do not possess the advantage of leaving a non-carbonaceous residue on decomposition, they are useful when re-winding machines which have to endure intermittent overloading rather than sustained operation at high temperatures.



A Metadyne machine main armature insulated with glass mica and semi-cured silicone elastomer materials

Main-Line Electrification in Chile

Equipment ordered for 3,000-*V. d.c. conversion between Santiago and Chillan*

THE Chilean Government last year authorised the Chilean State Railways to acquire from a group of Italian firms the motive power, substation and overhead line equipment necessary for electrification of the 248½ miles from Santiago (Alameda) to Chillan on the 3,000-V. d.c. system. The group, to which we referred in our January 31 issue, is known as the Grupo Aziende Italiane, and is constituted as follows: Breda Elettromeccanica e Locomotive, S.p.A., Milan; Breda Ferroviaria S.p.A., Milan; Compagnia Generale di Elettricita S.p.A., Milan; Ercole Marelli & Company, S.p.A., Milan; Industrie Meccaniche Aeronatiche Meriodionali AERFER, S.p.A., Naples; O. M. Officine Meccaniche S.p.A., Milan; and Stabilimenti Elettromeccanici Riuniti Ansaldo San Giorgio S.p.A., Genoa.

The orders placed with the above cover the following equipment:

Thirty-four Co-Co electric locomotives of 3,600 h.p. with regenerative braking, weighing 126 *tonnes* (ten of which will work on the existing Valparaiso-Santiago electrification)

Twenty-two Bo-Bo electric locomotivse of 2,400 h.p., weighing 85 *tonnes*

Five four-car multiple-unit sets of local services with rheostatic braking, of 1,600 h.p., weighing 150 *tonnes*, and with 336 seats

Three four-car multiple-unit trains of open stock with bar compartment, and also of 1,600 h.p. and with rheostatic braking, but weighing 170 *tonnes*, with 208 seats plus nine in the bar

Seventeen substations with water-cooled single-anode rectifiers and one mobile substation with similar rectifiers but air-cooled. Outputs will be adjustable between 2,000 V. and 3,300 V., but will be restored automatically at 3,000 V. in the event of an interruption of supply.

Substations

All the fixed substations will contain two 2,000-kW. equipments and will be fed at 66 kV. except for that at Espejo, 4½ miles from Alameda, where the high-tension supply will be at 110 kV. The 83½ miles to San Fernando are double-track and the remainder single. There will be one 2,000-kW. equipment in the mobile substation, which will be arranged for connection to a 44-kW. or 66-kV. supply. Remote supervisory control and telemetering facilities will be provided for the substations, which will be at an average spacing of 16 miles.

Deliveries of locomotives are to begin in 12 months, of multiple-unit trains for local services in 15 months and of long-distance multiple unit trains in 18 months. The first of the substation and supervisory equipment is due for delivery in 12 months.

Permanent Way

The permanent way is mainly of straight alignment with maximum gradients of 1 in 72. Curved sections of the route total some 27 miles, with radii between 918 and 6,560 ft. In general, the layout is suitable for high speeds. The track is composed of 100-lb. rail carried in chairs on wooden sleepers and ballasted to an average depth of 10 in. below the lower face of the sleeper. There is some track of 80 lb. per yd., with similar ballasting in stations. The gauge is 5 ft. 6 in.

Overhead Equipment

The overhead line consists of the following cables and components:—

A 300 MCM copper catenary, 152 sq. mm. (0·234 sq. in.) section, 19 strands, 0·92 lb. per ft.

Two grooved copper contact wires, 4/0 AWG, 214·4 sq. mm. (0·33 sq. in.) total section, 1·3 lb. per ft.

Droppers at intervals of 6 m. (19 ft. 8 in.), i.e., 12 droppers per 72-m. span, 0·12 lb. per ft.

The above total 2·34 lb. per ft.

Metal cross arms on top of the posts will carry auxiliary lines consisting of a copper feeder varying in section between 600 MCM and 3/0 AWG; a 7-strand, 3/0 AWG, copper negative feeder on the single-track section; and a three-phase line of 7-strand, 1/0 AWG, copper cable for lighting and power supplies throughout the route.

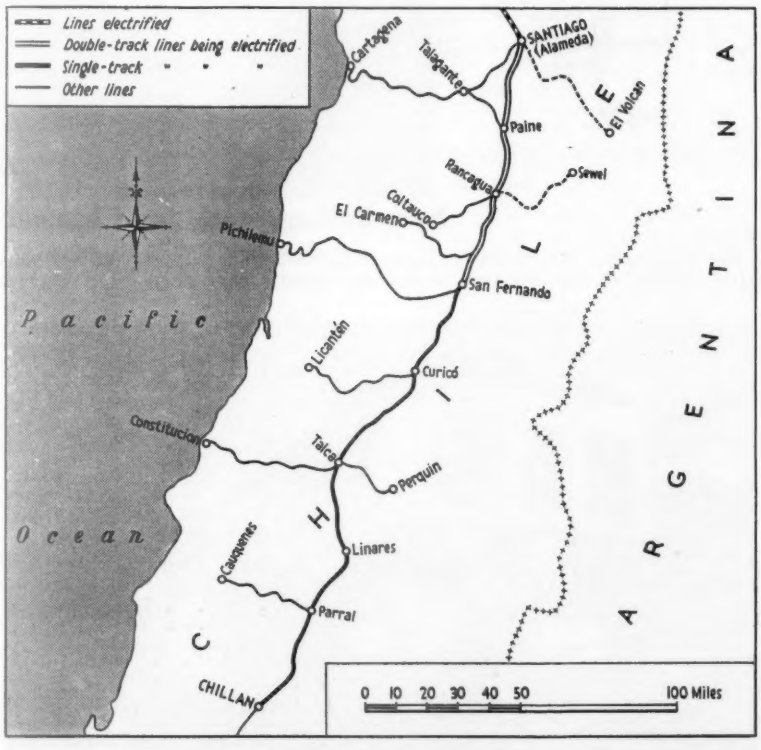
On both double-track and single-track sections the overhead line will be carried by wooden posts of circular section and three different diameters, set in concrete foundations. A diagram of an overhead line support is shown in the illustration on page 428. The compression tube, at an angle of 45 deg., is held by a horizontal stay, forming a cantilever. The hinged and pivoted support of the tube on the post permits vertical and horizontal movement. Registration arms will be of different lengths to give the overhead line a stagger of ± 8 in. relative to the centre line.

The spans on straight track will be of 72 m. (236 ft. 3 in.), and on curves they will be in accordance with the following table:

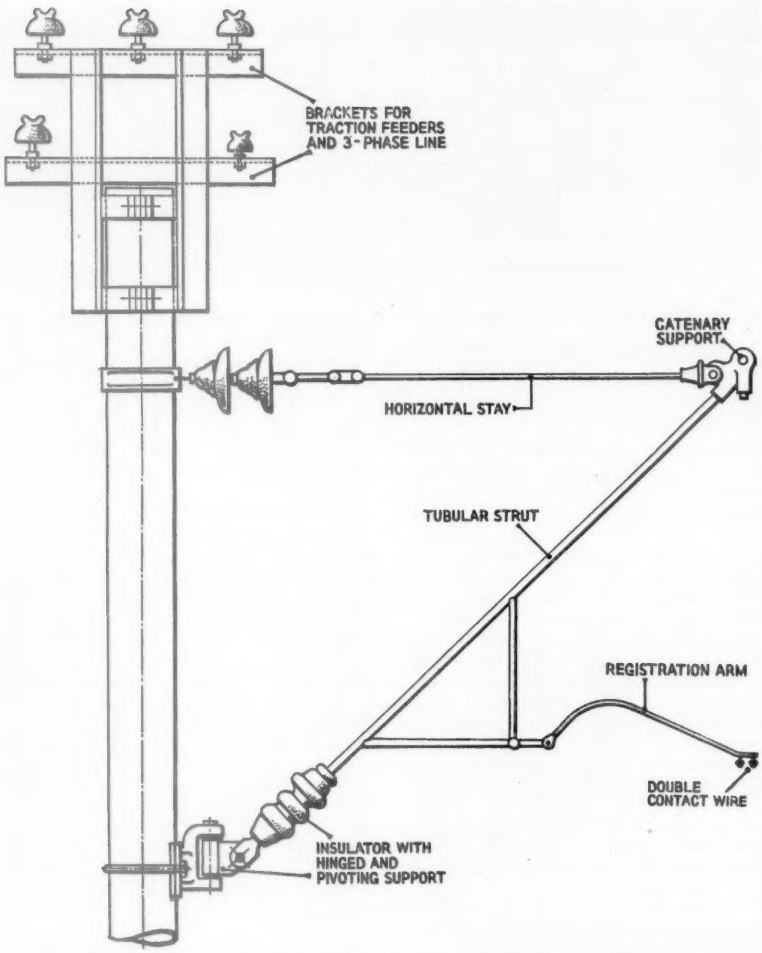
Minimum radius	Span
1,620 m. (5,316 ft.)	72 m. (236 ft. 3 in.)
1,120 m. (3,675 ft.)	60 m. (196 ft. 10 in.)
720 m. (2,362 ft.)	48 m. (157 ft. 6 in.)
405 m. (1,329 ft.)	36 m. (118 ft. 1 in.)
282 m. (925 ft.)	30 m. (98 ft. 5 in.)

Tensioning of Catenaries

At intervals of 1,440 m. (4,725 ft.) the catenary and contact wires are tensioned independently by balance weights. The catenary tension is 1,520 kg. (3,351 lb.) and that of the contact wires 1,600 kg. (3,527 lb.). Safety devices on the posts safeguard the system in the event of breakage of the catenary or contact wire. The longitudinal catenary is anchored firmly in the centre of the 1,440-m. lengths, so that overlaps occur at intervals of 720 m. which separate the sections electrically through-



Santiago-Chillan section of the Chilean State Railways, now being electrified, and adjacent lines



Overhead line support used on Santiago-Chillan electrified line

out the system. At stations the longitudinal catenary is supported by cross-catenaries carried on iron or concrete posts, with only one contact wire.

To determine the type of overhead construction best suited to the characteristics of the line and the density of traffic, three types were constructed to full scale, each consisting of two sections. These were as follows:—

1. A simple catenary of 4/0 AWG 7-strand copper supporting a 4/0 AWG slotted contact wire by means of droppers at intervals of 5 m. (16 ft. 5 in.). The spans were of 60 m. (196 ft. 10 in.).

2. A compound catenary consisting of a main catenary of 500 MCM copper, 19 strands; an auxiliary catenary of 3/0 AWG, seven-strand copper; and two contact wires of 4/0 AWG slotted copper. Spans of 60 m. Droppers between main and auxiliary catenaries at intervals of 5 m. (16 ft. 5 in.) and between the auxiliary catenary and the two contact wires at intervals of 2·5 m.

3. A catenary of 19-strand, 300 MCM copper and copper contact wires of 4/0 AWG. Copper droppers between catenary and contact wires every 6 m. (19 ft. 8 in.). Spans of 72 m. (236 ft. 3 in.).

Tests of Overhead Equipment

Tests were carried out with the above overhead systems to determine their elasticity and the effect produced by a speed of 56 m.p.h., as a result of which the line with the most favourable characteristics was found to be No. 3. With this construction, vertical deflection of the contact wires in relation to speed was less than with the other types because of the anchorage at each support. The relative elasticity between the centre of the span and the support points in this case was 1:2, compared with 1:4 with catenaries 1 and 3.

New Rolling Stock for Chamonix Line

The French National Railways have taken delivery of the first unit of the four new train sets ordered for their electrified metre-gauge line running through the Chamonix valley between St. Gervais, the terminus of the main line from Paris, and Vallorcine on the Swiss frontier, using 800 V. d.c. collected from a lateral third rail. This unit is one of the motor coaches, weighing 38 *tonnes* with a continuous rating of 545 h.p.

Motor coach for St. Gervais-Chamonix-Vallorcine line, S.N.C.F

The new train sets, each composed of two motor coaches with a trailer coach coupled between, will replace the present rolling stock which has been in service on this line since it was opened in 1901. At that time it ran between St. Gervais and Chamonix only and it was not until 1907 that it was extended from Chamonix to Vallorcine to connect there with the Martigny-Chatelard line in Switzerland which in turn gives connections at Martigny with trains on the Simplon Tunnel route.

The new sets will reduce the journey time, particularly between St. Gervais and Chamonix. During the summer service each set can carry 244 passengers and during the winter service 229 passengers.

RAILWAY NEWS SECTION

PERSONAL

Brigadier C. A. Langley has been appointed Chief Inspecting Officer of Railways, Ministry of Transport & Civil Aviation.

We regret to record the death, on April 1, of Sir James Milne, K.C.V.O., C.S.I., B.Sc., M.Inst.T., General Manager of the Great Western Railway from 1929 to 1947. Sir James Milne, who was born in 1883, joined the G.W.R. as a pupil in the Locomotive Department in 1904 and, after passing through the Swindon shops, mechanical laboratory, and drawing office, transferred to Paddington. He had experience in the office of the Superintendent of the Line and, later, in the General Manager's Office. In 1912 he returned to the former office, where he took charge of the Passenger Train Running Department. In 1916, he was appointed Chief Clerk to the Divisional Superintendent at Pontypool Road; and was for a short period Acting Divisional Superintendent, Swansea. In 1917 he became Assistant Divisional Superintendent, Plymouth. In 1919, his services were requisitioned by the Minister of Transport, under whom he was Director of Statistics. Subsequently he was selected to assist the Geddes committee on National Expenditure. On January 1, 1922, he was appointed Assistant to the General Manager, G.W.R., and in the following April, became Principal Assistant. Later the same year he was selected by Lord Inchcape to assist the Indian Retrenchment Committee, and was one of the co-signatories to its report. He returned to Paddington in April, 1923. In the same year he received the honour of the C.S.I. He was appointed Assistant General Manager in 1924 and in July, 1929, succeeded Sir Felix Pole as General Manager. He became a member of the Committee of Inquiry into the Coast Guard Organisation in 1931. He was knighted in 1932, and created a K.C.V.O. in 1936. Sir James Milne was a member, from its inception, and Deputy-Chairman from 1941, of the Railway Executive Committee, and took a leading part in dealing with the problems incidental to railway operation during the war and post-war periods. In 1940 he was elected a Director of the Great Western Railway Company, retaining the General Managership. In 1941, on ratification of this directorship, he resigned from the board of the G.W.R. This was done in deference to the wishes of the Minister of Transport, who could not accept him as a director of a railway company while he continued to serve on the Railway Executive Committee. The Minister also stated his desire for Sir James Milne to continue his service with that committee. Sir James Milne was a former Member of Council, and a former Vice-President, of the Institute of Transport. He resigned the General Managership of the G.W.R. in 1947. He was at one time Chairman of Hay's Wharf Cartage Co. Ltd., Pickfords Limited and Carter Paterson Limited, and a Director of Thos. Cook & Son Ltd. and of the following companies:—Birmingham & Midland Motor Omnibus Co. Ltd.; City of Oxford Motor Services Limited; Crosville Motor Services Limited; Devon General Omnibus & Touring Co. Ltd.; Thames Valley Traction Co. Ltd.; Western National Omnibus Co. Ltd.; Western Welsh Omnibus Co. Ltd., and Coast Lines Limited. He was also a director of the Leopoldina Railway Co. Ltd. When, at the end of 1944, Sir James Milne vacated the Chairmanship of the General Managers' Conference of the Railway Clearing House, he had had six successive years in that position. He had been Chairman of the conference when war broke out, and at the unanimous wish of his colleagues he continued in that capacity, and by doing so he established a record length of tenure of the office. In 1948, at the invitation of the Eireann Minister for Finance, he undertook an inquiry into the transport position of that country. At the time of his death he was Chairman of the Ship Mortgage Finance Co. Ltd., and a Director of the following companies:—Bedford General Insurance Limited, the Belfast Steamship Co. Ltd., Bentworth Trust Limited, the British & Irish Steam Packet Co. Ltd., British Holiday Estates Limited, the Central Africa Railway Co. Ltd., Coast Lines Limited, Nyasaland Railways Limited, Thos. Cook & Son Limited, Thos. Cook & Son (Continental & Overseas) Limited, the Trans-Zambesia Railway Co. Ltd., and the Tyne-Tees Steam Shipping Co. Ltd.

The late Sir James Milne
General Manager, Great Western Railway, from 1929 to 1947

Cremation took place on Saturday, April 5, at the Surrey & Sussex Crematorium, Crawley. The Rev. L. N. Phillips conducted the service. Among those present were:—

Lady Milne (widow), Mr. and Mrs. Terence Milne (son and daughter-in-law), Mr. Brian Milne (son), Sir William Stanier, Miss Elizabeth Stanier, Mrs. Michael Braithwaite, Mr. Michael Le Sueur.

Sir Allan Quartermaine, Mr. K. W. C. Grand, General Manager, British Railways, Western Region (representing the directors of the former G.W.R. Company), Mr. J. D. Swain, Mr. A. W. Woodbridge, Mr. Cyril Rider, Mr. R. Burgoyne, Mr. A. E. C. Dent, London Midland Region, British Railways (representing Mr. David Blee and Sir William Wood), Mr. Gilbert Matthews, Mr. W. P. Keith, Mr. F. Harding (Pullman Car Company), Mr. W. E. McIlroy and Mr. F. L. Brown (Nyasaland Railways), Mr. L. S. Hawkins (representing the Government of the Federation of Rhodesia & Nyasaland), Mr. A. L. Biggart (Shipbuilding Conference), Mr. C. A. Lensen (Shipping Mortgage & Finance Co.), Mr. Robert Semple.

Mr. C. P. Hopkins and Major-General Gilbert Szlumper were among those unable to attend.

A memorial service will be held at St. James' Church, Sussex Gardens, Paddington, London, W.2, at 12 noon on April 15.

An Appreciation

It does not seem so long ago now that I was saying "Goodbye" at Paddington to "Jimmy" Milne (as he was always known in railway circles) but, in fact, it is nearly 32 years ago. He was then Assistant General Manager and I had just been appointed General Agent for the G.W.R. in New York and Canada. We had not met before and the interview was typical of all he gave "I don't know what you are supposed to do—but Good Luck—and remember I want to see the U.S. and Canada, so I shall be over to see what its all about!"

Sure enough, he came in 1927 with the then General Manager, Sir Felix Pole, and other Chief Officers of the G.W.R. Milne wanted to see more of the U.S. and Canada than the rest of the party so I was deputed to travel with him, and this started a friendship which, as the years went by, strengthened and remained unbroken.

He had an intensely inquiring mind with a capacity for clear thinking which was quite exceptional. Financial problems were his joy, and withal he was a tremendous worker with not the slightest regard for time—as we on his personal staff could

Mr. B. Adkinson
Assistant Motive Power Superintendent, London Midland Region, 1954-58

Mr. C. G. Palmer
Appointed Motive Power Officer, Kings Cross, Eastern Region

Mr. K. F. Mason
Appointed District Goods Manager, Warrington, L.M. Region

testify! His knowledge of the G.W.R. and its problems was quite exceptional and he had the vision to press on with works of great expenditure—20-ton wagons involving the modernisation of the South Wales Docks and all their appliances—reconstruction of Cardiff General Station, Bristol Temple Meads and the remodelling of the great marshalling yards at Banbury, Severn Tunnel Junction and Rogerstone, together with the Westbury avoiding line—reconstruction and modernisation of the Great Western Hotels and the General Offices at Paddington—and modernisation of the cross channel fleet.

Many stories are told of him—this man of quick decisions—and one we remember is that of a rather pompous Chief Officer putting his head in at the General Manager's door one morning and asking "Can I have a quick decision this morning on a certain matter, Sir James?" Back came the answer without a turn of the head, "Yes—clear out!"

The last war—as I know, being with him each day—took great toll of his strength. As the Deputy Chairman of the Railway Executive he was, in fact, responsible for the working of the railways and the railway-owned docks. All through the raids—and there were many—he appeared quite unruffled and inspired a quiet confidence.

I remember him for the simple things which mean so much—his love for his family—our efforts together trying to play golf on the tricky course at Tregenna—his intense dislike of public speaking (and my "underground" efforts to get him to speak, which he could do well!)—his sense of humour and human understanding—his regard for the staff—and his pride in the company.

We who knew him so well, will miss him at Paddington.—K. W. C. G.

Mr. B. Adkinson, Assistant Motive Power Superintendent, London Midland Region, British Railways, who has retired, joined the Great Northern Railway in 1908 as a messenger. He became an engineering apprentice in 1910. He later served at several engine depots as Mechanical Foreman and as District Superintendent at Hitchin, Hornsey, Norwich, Manchester, and Doncaster. In 1949 he became Administrative and Motive Power Assistant, Railway Executive. In 1954, after a period as Acting Motive Power Superintendent to British Railways (Eastern Region), he was appointed Assistant Motive Power Superintendent, London Midland Region. Mr. Adkinson was educated at Kings School, Grantham, and Nottingham University. He gained a B.Sc. (Engineering) Hons. Degree at London University, and an Honours Certificate at the City & Guilds College, London.

Mr. G. M. Booth
Appointed District Operating Superintendent, Liverpool Street, Eastern Region

Mr. C. Scutt
Appointed Motive Power Assistant, Eastern Region

Mr. A. E. Grimsdale
Appointed Director & Commercial Manager, M.-V. Electrical Co. Ltd.

Mr. C. G. Palmer, District Motive Power Superintendent, Peterborough, Eastern Region, British Railways, who, as recorded in our February 28 issue, has been appointed Motive Power Officer in the Office of the Line Traffic Manager (Great Northern), Kings Cross, was educated at the Denbighshire Technical College. He began his career with the former London & North Eastern Railway in 1925 as an apprentice in the Locomotive Running Engineer's Department at Wrexham, transferring in 1929 to Doncaster Plant Works. On completion of his apprenticeship he took up a position at Kings Cross, subsequently moving to Hornsey Motive Power Depot as chargehand fitter. In 1941 he became Mechanical Foreman, Doncaster, later serving in a similar capacity at Retford. In 1945 he was made Locomotive Shedmaster, Lincoln, where he remained for two years. In 1947 he was appointed Assistant District Motive Power Superintendent, Peterborough, becoming District Motive Power Superintendent, Peterborough, in 1955.

Mr. Kenneth F. Mason, who, as recorded in our March 14 issue, has been appointed District Goods Manager, Warrington, London Midland Region, British Railways, joined the former L.M.S.R. at Hendon in 1934, and subsequently worked at various goods stations in the London area. During the war he served in the Royal Fusiliers and the Norfolk Regiment. On demobilisation he entered the office of the District Goods Manager, Broad Street, London. He later trained as a Traffic Apprentice and in 1949 was appointed Goods Agent, Chorley. Mr. Mason became Goods Agent at Deptford Wharf in 1953 and at Plumstead in 1954. In 1955, he was appointed Assistant District Goods Manager (Sales), Manchester.

Mr. G. M. Booth who, as recorded in our March 7 issue, has been appointed District Operating Superintendent, Liverpool Street, London Midland Region, British Railways, joined the former Great Central Railway in September, 1918, in London. In 1925 he became a member of the staff of the Chief General Manager of the London & North Eastern Railway and, three years later trained as a Traffic Apprentice at a number of places in the Eastern Counties. He subsequently became Stationmaster at Bethnal Green, Ilford, and Ipswich. Towards the end of the war he became Stationmaster, Liverpool Street, where he remained for seven years. In 1951 he was appointed Assistant District Operating Superintendent Stratford, and, in 1954, District Operating Superintendent at Norwich. He became District Operating Superintendent Stratford, in July, 1957.

Mr. C. Scutt, A.M.I.Mech.E., M.I.Loco.E., who, as recorded in our March 14 issue, has been appointed Motive Power Assistant in the office of the Line Traffic Manager (Great Eastern), Liverpool Street, Eastern Region, British Railways, joined the former London & North Eastern Railway at Doncaster in 1932 as an Apprentice Fitter. In October, 1939, he became a fitter and, in 1942, was transferred to Mexborough as a workshop foreman. In 1943 he was appointed a Mechanical Foreman at Sheffield and, in 1948, became Locomotive Shedmaster, Trafford Park. In 1949 he entered the office of the Motive Power Superintendent at Liverpool Street, as an assistant and in September, 1952, transferred to the Western Region as Assistant District Motive Power Superintendent, Worcester. In 1954 he returned to the Eastern Region as Assistant District Motive Power Superintendent, Cambridge. He was promoted to be Assistant to Motive Power Superintendent (Utilisation) Eastern Region, in 1956, the position which he now vacates.

Mr. A. E. Grimsdale, B.Sc.(Eng.), Manager, Home Sales, Metropolitan-Vickers Electrical Co. Ltd., who, as recorded in our March 7 issue, has been appointed Director & Commercial Manager of that company, graduated from Brighton Technical College. He joined the Metropolitan-Vickers Co. Ltd., as a college apprentice in 1922, and after three years as traction engineer in the company's Sydney (Australia) office, and a further two years in the Traction Control Department at Trafford Park, he transferred to the Traction Sales Department in 1932. From 1941 to 1945 he was Assistant to the Works Manager at the company's Sheffield works, where he was concerned with the wartime production of rotating electrical machines for service contracts. At the end of the war he became Deputy Sales Manager, Traction Department, and, in 1946, was appointed Sales Manager of that department. He became Special Assistant, Sales Management, in January, 1953, and Manager, Home Sales, in February, 1957. Mr. Grimsdale has been a director of Metropolitan-Vickers Electrical Export Co. Ltd. since 1954.

Mr. H. Leach, Assistant (Passenger Services) to the Commercial Officer, Euston, London Midland Region, British Railways, is retiring after 47 years of service.

The recently inaugurated North-Eastern Frontier Railway of India announces the following appointments:—

Mr. D. C. Baijal as General Manager; Mr. S. N. Barua as Deputy General Manager (Works); Mr. Rajendra Dev as Deputy General Manager, Katihar; Mr. K. K. R. Rao as Secretary to General Manager; Mr. S. Ramamurti as Deputy General Manager (Personnel).

Engineering

Mr. V. P. Rebeiro as Chief Engineer; Mr. B. C. Ganguli as Engineer-in-Chief; Mr. B. Basu as Deputy Chief Engineer (North); Mr. S. Venkataramanan as Deputy Chief Engineer (South); Mr. Inder Singh as Deputy Chief Engineer (Bridges).

Operating

Mr. Ranjit Singh as Chief Traffic Superintendent; Mr. M. K. Majumdar as Deputy Chief Traffic Superintendent (Commercial); Mr. A. B. Lal as Deputy Chief Traffic Superintendent (Operating).

Mechanical

Mr. I. Hydari as Chief Mechanical Engineer; Mr. P. N. Khanna and Mr. V. S. Ramaswami as Deputy Chief Mechanical Engineers.

Electrical

Mr. R. J. Batliwala as Deputy Chief Electrical Engineer.

Signal & Telecommunication

Mr. R. S. Mehta as Deputy Chief Signal & Telecommunication Engineer.

Accounts

Mr. G. F. Penn Anthony as Financial Adviser & Chief Accounts Officer.

Medical

Mr. S. L. Malhotra as Chief Medical Officer.

Stores

Mr. A. T. Mansukhani as Controller of Stores.

H.M. the Queen, Sovereign Head of the Grand Priory in the British Realm of the Most Venerable Order of the Hospital of St. John of Jerusalem, has been graciously pleased to promote Mr. H. A. Short, General Manager, North Eastern Region, British Railways, from Officer Brother to Commander Brother of the Order. H.M. the Queen also has been pleased to admit the following North Eastern Region staff as Serving Brothers of the Order: Dr. R. F. MacKenzie, Regional Medical Officer; Mr. H. Ingham, Chief Forwarding Clerk, Huddersfield; Mr. J. H. Elders, Foreman, Carriage & Wagon Department, Shildon, and Mr. H. Selway, Driver, Motive Power Department, Holbeck, Leeds.

Mr. R. T. Vaughan has been appointed Assistant to the President, Canadian National Railways.

We regret to record the death, on April 6, at the age of 81, of Mr. William Thomas Briggs, A.M.I.E.E., formerly of the Egyptian State Railways.

The City & Guilds of London Institute has conferred its Special Annual Award in mechanical engineering on Mr. R. C. Bond, Chief Mechanical Engineer, British Railways, Central Staff, B.T.C.

Mr. R. Johnson has been appointed Managing Director of the new Bulawayo factory of the Dunlop Rubber Co. Ltd.

The Rt. Hon. Sir David Eccles, President of the Board of Trade, will visit Venezuela, Trinidad, and Brazil to stimulate interest in U.K. trade.

Mr. Herbert E. Hill has been appointed a director of Associated Commercial Vehicles Limited, and has resigned from Park Royal Vehicles Limited, a subsidiary company.

Mr. M. F. Barnard has been re-elected President of the Mansion House Association on Transport and Mr. J. W. Bannard, Assistant Transport Adviser to the board of Unilever Limited, has been elected Chairman of Council of the Association.

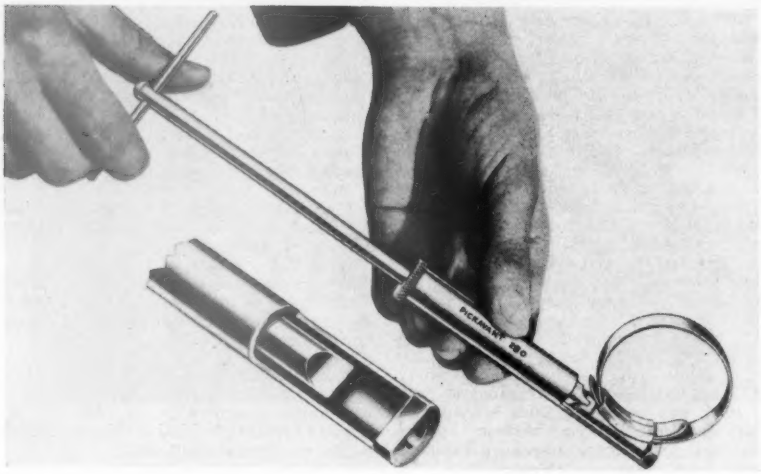
Small & Parkes Limited announces the retirement, on April 1, of Mr. H. Hicklin, Works Manager, and the following appointments will take place:—Mr. F. P. Parkes as Works Manager (Friction Materials); Mr. W. L. Varty as Works Manager (Textiles); Mr. E. J. Parsons as Sales Manager (Friction Materials); and Mr. W. A. Parkes as Sales Manager, London Area.

Mr. B. A. Gay, Manager of the Dunlop Rubber Co. Ltd. tyre depot at Bristol, has been appointed Regional Manager for that company in the West of England. He succeeds Mr. J. M. Simon, who becomes Assistant to the General Manager of the India Tyre and Rubber Company.

Mr. R. J. Masterson has been appointed Manager, Central African Division, of Expandite Limited. Mr. P. L. Critchell, Technical Advisory Officer to that company, has been appointed Manager of the newly-formed Sales Development Department.

Mr. A. J. Clark and Mr. E. Bateson are retiring shortly from the Partnership of Messrs. Rendel Palmer & Tritton, Consulting Engineers, and will become Consultants to the firm. Mr. H. Scrutton, Mr. H. F. Merrington and Mr. B. G. R. Holloway, senior engineers on the staff, will be taken into partnership early this month. Mr. P. R. Robinson became a Consultant to the firm in July last.

NEW EQUIPMENT AND PROCESSES



Elevating Trolley for Press Dies

A TROLLEY with rotating table and side shift features has been designed to facilitate the removal and replacement of heavy press dies in the limited space which is normally available in workshops. The use of this equipment is stated to obviate the considerable time and effort usually required.

It is a hydraulic truck with a roller top platform to prevent damage to the dies. This carries the dies firmly in a horizontal position. The truck has a loading height of 8 in. and lifts to the height required for the fitting and removal of the dies. It can handle dies of a wide variety of sizes.

The platform will swivel through 360 deg. and can move laterally a maximum of 6 in. to either side on a swinging arm. When manoeuvring in aisles the die can be swung out into any position and then rotated, thus obviating the most usual difficulty of restricted space; thus, in effect, it can reach any required position although the base remains stationary. It is intended that one operator would be able to change the dies as required.

The truck is strongly built on a low chassis. It has solid rubber tyres on double row ball bearings, two of which fully castor so that the truck is very mobile. The hydraulic system with a pivoting foot lever may be operated from either side of the truck. The self-locking release valve is operated by a foot lever from either side of the truck and gives a controlled lowering speed. The oil reservoir is equipped with a magnet to trap any metal abrasion particles.

In the standard type of universal lift truck, model UHR, the lift platform may be swivelled through 360 deg., and moved laterally a maximum of 6 in. to either side on a swing arm. The effective lift is 27½ in., lowered height 9½ in., but extensions for higher lifts are available. Various capacities from ¼-1 ton are available. Other types of attachment are also supplied so that the applications are very wide.

The truck is marketed in the United Kingdom and British Commonwealth by G. Hunter (London) Limited, 80, Fenchurch Street, London, E.C.3, from which company further details can be obtained.

Hose Clip Tool

THE Apkoway hose clip tool, now available, has been designed to assist in the speedy and safe fitting and removal of clips of the Cheyney, Collier, Jubilee, Terry and similar types. Such clips are used in diesel locomotive and railcars, for hose and cabling applications, besides workshops and so on.

It incorporates a specially hardened spring-loaded screwdriver bit that enables the hose clip to be firmly gripped whilst the adjusting screw is tightened or released.

Apart from being easier to use than an ordinary screwdriver, the tool eliminates the danger of injury due to slipping and saves a considerable amount of time. The inset illustration shows the shielded end of the blade and the larger, the method of application.

It measures 9 in. in length and weighs 6 oz. and is quite convenient to carry. It has a bright nickel finish as a protection against rust.

Further details can be obtained from the manufacturer, J. W. Pickavant & Co. Ltd., Apkoway Works, Bow Street, Birmingham 1.

Butuminous-Epoxy Protective Coating

A PROTECTIVE coating for metal and concrete surfaces, Epimastic, which has been developed, is stated to combine the waterproofing properties of coal-tar-pitch with the resistance to chemical attack and corrosion of epoxy resins.

The material is claimed to have excellent adhesion to both metal and concrete surfaces and to be able to withstand exposure to acids, alkalis, oils, fats and other corrosive chemicals. It also has good resistance to abrasion and other forms of mechanical wear or shock. It can be applied to almost all types of industrial equipment where surface protection is desired and retains its properties over long periods of time.

Epimastic consists of two components, that is, a base and catalyst. These are supplied in the correct proportions for admixture to ensure proper "curing," the tin containing the base being only partially filled for this purpose. The mixture should be thoroughly stirred and used within the stipulated period. Only enough of each component should be mixed at any one time for the job in hand, as the pot life of the mixture is 24-36 hr. at normal temperatures.

A substantial film thickness is ensured at the recommended rate of 25 sq. yd. per gal. per coat and is obtained by brush application. Surfaces should be as thoroughly cleaned as time and expense will allow. All loose rust, dirt and old

paint should be removed before application.

The recommended minimum number of coats is two. Drying time is 5-6 hr. to tack dry and in 16-24 hr. the surface is ready for overpainting. The finish of the product is black.

The price of Epimastic is 62s. 6d. per gal. Further details may be obtained from the manufacturer, Wailes Dove Bitumastic Limited, Hebburn, Co. Durham.

Four-Wheel Drive Tractor Shovel

THE Muir-Hill Model 4-WL Tractor Shovel, recently developed, is a heavy duty machine designed to give crawler tractor performance with the manoeuvrability of a rubber-tyred unit. This is achieved by four-wheel drive transmitted through large wheels at minimum centres, carrying a chassis and superstructure of great strength and rigidity.

The whole construction is integral, there being no articulation whatsoever in the suspension, whilst steering is effected by clutches and brakes.

During the period of testing this machine is stated to have evinced good qualities in performances on unmade ground, resulting largely from the form of construction and materially assisted by the provision of a six-speed gearbox, plus supplementary hub reduction gear, giving a choice of twelve forward speeds and four reverse, through the four-wheel drive system. It is equipped as standard with a ¾ cu. yd. full width bucket; a full-flow filtered hydraulic system with double acting rams to both beam and bucket, enables either automatic or driver controlled "roll-back" action to be operated.

The 4-WL is manufactured by E. Boydell & Co. Ltd., Old Trafford, Manchester, 16.

Mobile Hydraulic Scaffolding Equipment

THE Aydee hydraulic scaffolding is a mobile equipment designed for building and general maintenance work where conventional hand erected scaffolding would normally be used. The hydraulic system can raise the working platform to any height up to 15 ft. 6 in. quickly; it can also be used for lifting materials.

The undergear is designed for road towing, having heavy duty pneumatic tyred wheels with braking mechanism. Sturdy supports are incorporated for levelling up when sited. It can, alternatively, be mounted on a platform trailer or railway wagon for tunnel and bridge maintenance.

The unit is constructed from welded steel sections. It is powered by a 1½ h.p. air-cooled, four-stroke petrol engine, flexibly coupled to a gear-type hydraulic pump capable of a working pressure of 1,500 lb. per sq. in. Alternatively, a diesel engine or electric motor drive can be fitted. Two lifting jacks are operated by simple hydraulic control gear and a positive hydraulic locking device is fitted.

Main dimensions of the equipment are as follow: maximum platform height, 15 ft. 6 in. above ground level; platform width without extension, 2 ft. 8 in.; platform width with extension, 3 ft. 11 in.; platform length, 20 ft.; overall length with platform lowered, 30 ft. (including towbar); minimum height of platform, 4 ft.; time for erection to full height, 90 sec.; maximum load, 20 cwt.

A handrail is provided which is interchangeable with the platform extension for use when working against a structure, but for bridge or tunnel work two handrails can be fitted.

The price is approximately £500, and delivery about six weeks. Further details may be obtained from the manufacturer, Auto Diesels Limited, Uxbridge.

Surface Treatment Lubricant

A SURFACE treatment grade of molybdenised lubricant, Molytox Plus, is stated to produce a film which resists wear over 15 times as long as the original grade of the product and also to be superior to existing varnish-held dispersions and so-called molybdenised disulphide plating processes.

It can be used for the pretreatment of bearing surfaces, gear teeth, sliding mechanisms, cutting tools, dies, machine tool dressing to lengthen tool life and prevent build-up of soft metals, lightly loaded ball and roller bearings requiring long term dry lubrication and so on. It is a general purpose fluid for the "dry" lubrication of both metallic and non-metallic surfaces.

The film of the product will also withstand normal handling and provide considerable protection against corrosion. Parts treated wtih Molytox Plus may be safely packed in paper wrappings.

It can be applied directly to normally clean engineering surfaces by brush, spray or dipping. For the best results, the following procedure is advised:—The work should be clean and, if possible, degreased; dried at 80-100° C., the product should be applied while the work is still warm by dipping, spraying or brushing.

The treated articles should be uniformly coated with a continuous grey surface, which can be handled without loss of lubricant. Molytox Plus can be diluted with alcohol or isopropyl alcohol. It is manufactured by Rocol Limited, Rocol House, Swillington, Leeds.

False Ceilings in London Transport Escalator Shafts

One of the problems in the maintenance of escalator shafts at certain London Transport Underground stations is the prevention of water seepage and consequent discoloration of the roof. This occurs where escalator shafts pass through water-bearing strata and is caused by water seeping through the joints between tunnel segments. The fact that the water is often under pressure at this level facilitates leakage and has been responsible for cracking the various waterproofing materials applied to the usual construction of plaster over steel netting.

To resolve this difficulty, London Transport is now experimenting with two types of false ceiling, using aluminium for one and plastic for the other.

Aluminium Sheet

The aluminium installation is in a three-bank escalator shaft at Hyde Park Corner Station on the Piccadilly Line and includes a small area of flat ceiling at the top of the shaft in addition to the main curved ceiling over the escalator. The total area is some 6,300 sq. ft.

The curved ceiling, 130 ft. long and of 22 ft. dia., is constructed of 18-gauge (0·048-in.) 12-ft. 6-in. × 2-ft. 3-in. sheets in Noral M57S alloy of half-hard temper. These are secured to a steel framework of tees and angles by extruded cover strips in Noral 50 SW alloy which are screwed to hardwood filler pieces on each side of the tees following the curvature of the roof. The longitudinal cover strips and the guttering at the lower edge of the ceiling are also of extruded sections secured in the same way. The flat area at the top of the shaft is constructed on the same principle as the curved ceiling and the same materials are used.

Anti-Corrosive Finish

To prevent attack of the aluminium, the whole of the back of the sheeting was given a coat of bituminous paint, and cadmium-plated screws were used throughout. The aluminium was supplied by Northern Aluminium Co. Ltd. and anodised by the Acorn Anodising Co. Ltd. to give a silver finish.

The other experimental false ceiling, which has been fitted in the shaft of a two-bank escalator at Bond Street Station on the Central Line, consists of sheets of a composite plastic material, with a white stoved finish, fitted over a plastic framework. A similar installation is being fitted in an escalator shaft at Highgate Station on the Northern Line.

The work has in both cases been carried out to the design and under the supervision of Mr. C. E. Dunton, Chief Civil Engineer of the London Transport Executive.

Both false ceilings have been designed so that any water seeping through on to the upper face of the sheets will run down into channels behind the advertisement panels on both sides of the shaft and discharge to the normal drainage system. Although different materials have been used in their construction, both ceilings share the advantages of being lightweight, resistant to corrosion and impermeable to water. It is thought that one or both of these systems will provide a means of preventing the unsightly discoloration of escalator shafts.

Aluminium alloy, false ceiling spanning a three-bank escalator shaft at Hyde Park Corner Underground Station

Memorial Portrait of Frank Pick

On Monday, March 31, Sir John Elliot, Chairman of the London Transport Executive, introduced a new portrait of the late Mr. Frank Pick to a number of past and present officers of London Transport who were closely associated with Pick during his tenure of office at 55, Broadway. The portrait, which is by Mr. Patrick Larking, R.O.I., is hung in the chairman's room at 55, Broadway, which already contains a portrait of Lord Ashfield by Sir William Orpen.

Sir John Elliot, speaking at the unveiling, said that Frank Pick's contribution to the happiness of millions of Londoners perhaps had been greater than that of any other man, with the possible exception of Lord Ashfield, at whose right-hand he had sat for so many years.

Mr. John Cliff, who was intimately connected with the work of both Ashfield and Pick, also spoke briefly. He commended the work of the artist and said how glad he was that Sir John Elliot had had the idea of including a picture of Mr. Pick to accompany that of Lord Ashfield.

Portrait of Mr. Frank Pick by Mr. Patrick Larking, R.O.I., hung in the chairman's room at London Transport Headquarters

THROUGH BOOKINGS FROM UNDERGROUND STATIONS TO COASTAL RESORTS.—Through cheap tickets from many Underground stations to eight coastal resorts will be sold by London Transport this summer. The object is to enable excursionists to buy the ticket for the full journey at local Underground stations, eliminating possible booking-office queues at main-line terminals. Both the British Railways and L.T.E. portions of the fares will be at cheap rates. The tickets will apply to Brighton, Bognor Regis, Littlehampton, Eastbourne, Bexhill, St. Leonards, and Hastings, with bookings from 130 stations, and to Southend with bookings from all Underground stations.

BRISTOL OMNIBUS CO. LTD. NEW BUS STATION AT BATH.—The Bristol Omnibus Co. Ltd. new Manvers Street Omnibus Station and offices at Bath were opened on April 1 by the Mayor of Bath. The Chairman of the Company, Mr. S. Kennedy, presided, supported by the other directors, Messrs. H. E. R. Bastin, I. R. Patey (who is also General Manager), C. H. S. Pickett, and A. C. B. Pickford. By arrangement with the Corporation, the new bus station occupies a site which suffered extensive bomb damage during the war, and which is conveniently close to the Bath Spa Railway Station of British Railways, Western Region. The new building is on two floors. There are 19 bays for standing vehicles, all situated on the railway station side of the bus station building, and buses reverse on to these stands. At Bath, the existing buildings around the site are generally of a domestic character and of a scale easily carried out in 17th- and 18th-century constructional methods. The scale of the new bus station is larger, but an attempt has been made to introduce Georgian proportions to make the new building blend with the surrounding properties. The architect is Mr. Alan A. Briggs, F.R.I.B.A., and the general contractor Stone & Co. (Bristol) Ltd.

Ministry of Transport Accident Report

Herne Hill, June 30, 1957: *British Railways, Southern Region*

Colonel D. McMullen, Inspecting Officer of Railways, Ministry of Transport & Civil Aviation, inquired into the accident which occurred at about 9.3 a.m. on June 30, 1957, at Herne Hill, when the 8.55 boat express, Victoria to Dover Marine, consisting of 10 bogie coaches and luggage van, drawn by "Battle of Britain" class 4-6-2 engine No. 34088, ran by distant and home signals and collided at about 30 m.p.h. with a light engine of the 4-4-0 "Schools" class which had just moved away from the starting signal and was pushed 300 yd. on to the Tulse Hill branch with tender badly damaged.

The engine of the express stopped about 30 yd. beyond the point of impact with its front end considerably, and seven of the coaches slightly, damaged. Of the 270 passengers 19 complained of shock or bruises; two were taken to hospital but were not detained. The driver of the light engine received cuts and bruises and was admitted to hospital but discharged the following day. Assistance was summoned immediately and arrived quickly; passengers went forward by special train at 11.47, the steamer being held for it. Several lines were blocked but re-opened gradually as soon as possible; normal working was resumed by 1.35 p.m. It was warm with bright sun. The accompanying diagram shows the lines, signals, track circuits, etc., essential to an understanding of the case.

Signalling Arrangements

The signalling is worked from a box opened in 1956, with detonator placers on all lines opposite it. Track circuit and other controls are very complete and those involved in the incident are referred to on the diagram. The banner signal repeaters on the down main platform work automatically and are not themselves track controlled. It is to be specially noted that it is impossible to send a release by the Sykes block to Brixton unless distant signal No. 72 and its slot are "on," levers 71, 73 normal, and track circuits clear as far as the beginning of the station itself; a modified overlap is authorised.

The Brixton advanced starting with No. 72 below come into view from the right hand (fireman's) side at 280 yd. and clearly against a background of trees, and at 90 yd. from the driver's side, remaining in his view until passed. Home signals 71-73 are first seen on a left-hand curve from the driver's side at some 600 yd. and remain in sight for 180, but the background is not particularly good. Shortly after they can be seen clearly from the fireman's side and again, at 90 yd. from the driver's. The banner repeaters can first be seen from the driver's side at the home signals.

The speed is limited to 25 m.p.h. through Brixton and 45 through Herne Hill.

Course of Events and Evidence

Two signalmen were on duty as usual but no booking boy, as it was Sunday, and one of them was dealing with the train register. Trains from Victoria to Orpington and Ramsgate passed through from Brixton before the light engine and at 8.55 one from Holborn to West Croydon via Tulse Hill was accepted. It was stopped at the home signal and then allowed into the down slow platform.

At 8.56 the light engine was accepted from Brixton and stopped at signals 71-73; it was allowed forward to the starting signals when the West Croydon train stopped. Signal 71 was replaced and that train sent away over points 59 and 58, after which the former were replaced normal and signal 68 cleared for the engine to follow to signal 66. It did not move at once and had only just started when the collision took place.

The express had been accepted at 9.0 on arrival of the engine in the station. One of the signalmen was at the booking desk when a lineman told him the express was overrunning the home signal and he tried to operate the detonator placer, but it was too late. The other signalman heard this warning and both men observed the home signals to be properly against the train, with the repeater of the distant indicating "caution." (This was proof that the slot lever itself as well as the arm was normal.) Both men thought the train to be travelling at the usual speed for a through running steam train, 40 to 45 m.p.h.

As far as the signalman concerned could remember the distant had not been worked for the Ramsgate train; it had certainly been for the one to Orpington that preceded it. This man said he always looked at the repeater when replacing the lever and did so on that occasion. He had not attempted to clear any signals for the express. It had been found necessary on most days in the hot weather to work the wire tensioners, but he had not operated the one for signal 72 that morning and it was functioning correctly. Both men had worked for several months in the box and knew of no "danger side" failure of the equipment.

The lineman who saw the train overrunning checked the lever positions and saw the distant repeater to be at "caution."

The passed fireman in charge of the light engine said that on signal 68 being cleared for him he re-created vacuum and had just done so when his fireman shouted there was a train coming and jumped off; he opened the regulator to keep ahead but had only just begun to move when the collision occurred.

The boat train driver, aged 56, driver since 1944, had worked regularly over this line. The fireman, with him about 10 weeks, became one in 1953 but was with the forces for two years from November, 1954.

They left Victoria to time and at Brixton the fireman, in reply to an enquiry from the driver, told him that the distant for Herne Hill was off. The driver did not cross the footplate to verify that but said he saw it with the arm above at clear on passing it. His fireman began firing and did not look for the Herne Hill home signals, but he himself looked when about to pass them and made sure one was "off;" he had not seen them earlier when they came into view on the left-hand curve. Noticing the upper banner repeater "off" and the lower "on" he closed the regulator, then saw the engine; he thought he had reduced speed before striking it.

Questioned closely about the Brixton signals, he maintained that he had seen both arms there to be well "off." The extensive controls involved were explained to him but he would not admit that the sun might have made it difficult for him to see them, or that, having been informed that the distant was clear, he looked at neither. He was sure nothing distracted his attention at the critical moment. His previous day's work had been normal, with eight hours sleep; he was not tired and had nothing on his mind. He and his fireman were not talking. He could not remember the last occasion on which a fast train had been stopped out of course at Herne Hill.

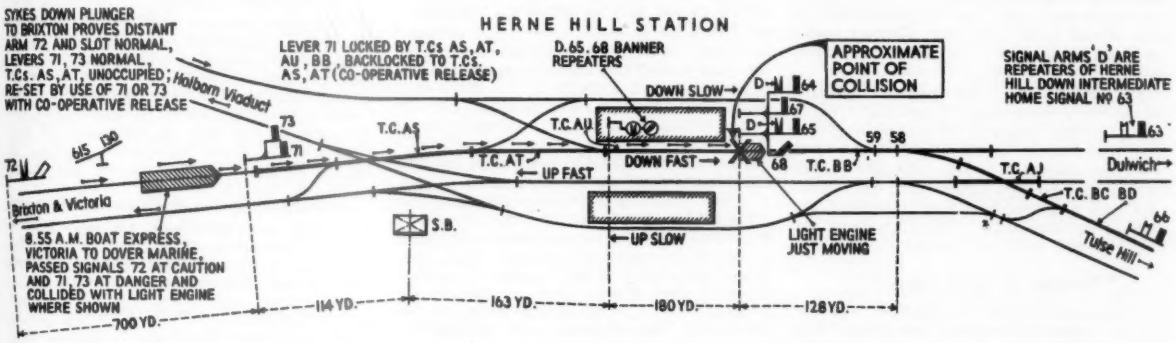

HERNE HILL STATION
SYKES DOWN PLUNGER TO BRIXTON PROVES DISTANT ARM 72 AND SLOT NORMAL, LEVERS 71, 73 NORMAL, T.Cs. AS, AT, UNOCCUPIED; RE-SET BY USE OF 71 OR 73 WITH CO-OPERATIVE RELEASE
LEVER 71 LOCKED BY T.Cs AS, AT, AU, BB, BACKLOCKED TO T.Cs. AS, AT (CO-OPERATIVE RELEASE)
D.65.68 BANNER REPEATERS
APPROXIMATE POINT OF COLLISION
SIGNAL ARMS 'D' ARE REPEATERS OF HERNE HILL DOWN INTERMEDIATE HOME SIGNAL Nº 63
Holborn Viaduct
DOWN SLOW
DOWN FAST
UP FAST
UP SLOW
T.C. AS
T.C. AU
T.C. AT
T.C. BB
T.C. AJ
T.C. BC BD
S.B.
Brixton & Victoria
Dulwich
Tulse Hill
8.55 A.M. BOAT EXPRESS, VICTORIA TO DOVER MARINE, PASSED SIGNALS 72 AT CAUTION AND 71, 73 AT DANGER AND COLLIDED WITH LIGHT ENGINE WHERE SHOWN
LIGHT ENGINE JUST MOVING
700 YD.
114 YD.
163 YD.
180 YD.
128 YD.

Diagram showing circumstances of accident at Herne Hill, British Railways, Southern Region, June 30, 1957

The fireman was equally insistent about the signal indications; both arms were well "off." He was sure the sun—on his side—did not affect his view. He did not look for the home signal, but would have done so had the distant been "on."

The guard, in the ninth vehicle, said they were running normally through Herne Hill, but his compartment had neither side lights nor periscope. He tried to look at the signals at Brixton but could see nothing for smoke and smuts.

The station foreman saw the express entering at the usual speed on clear signals, then signal 68 at clear and, for the first time, the light engine. He tried unsuccessfully to attract the express driver's attention.

Examination of the signalling equipment, in particular of the distant proving circuit, showed everything to be in order. No complaints had been received from enginemen about the down Victoria line signals.

Inspecting Officer's Conclusions and Remarks

The distant arm could have been at clear only if it had not responded to the last replacement of the lever or the wire had been too tight. In the latter case the arm would have been only slightly raised and not well "off," as both enginemen stated.

In either event the proving control would have prevented "line clear" being given for the express. There is evidence that this—which is not complicated—was working correctly. The repeater would have indicated this defect and the signalmen and lineman were sure it showed the arm to be at caution. They also saw the home signals to be at danger.

Failure to Obey Signals

Colonel McMullen is satisfied that this was so when the express passed and that the accident was due to the driver's failure to obey the signals. He has little doubt that the driver, in spite of his insistence to the contrary, having been told the distant was "off," did not trouble to look at it or the home signals but assumed the line to be clear, as is usual for a train of this importance. The fireman did look at the signal but Colonel McMullen is unable to understand why he thought it was clear. He knew the signals and his eyesight is good, and this distant is conspicuous with no other signal in the vicinity. This man has a clear record and the driver's has been clear for six years.

Absence of sidelights and periscope did not make it easy for the guard to observe signals as required by rule, but he is thought to have made no real effort to do so approaching Herne Hill.

The light engine driver's action was commendable. He must have realised a collision was inevitable but remained on the footplate. Keeping the engine moving undoubtedly reduced the severity of the shock and damage; with cuts and bruises and badly shaken, he endeavoured to turn on injectors and put out the fire.

The accident should have been prevented by the recently approved British Railways "warning" A.T.C. This section of line, however, is not likely to rank high in priority for it, especially as colour-light signals are to be installed in the near future.

Although the latter cannot be regarded as a substitute for A.T.C. they should render errors of this type less likely.

Staff and Labour Matters

London Bus Workers' Pay Claim

A strike of London bus, trolley bus and Green Line coach workers is to begin on May 5 unless agreement can be reached between the London Transport Executive and the Transport & General Workers' Union on the pay dispute.

The decision to call an official strike was announced on April 2 after final rejection by the T.G.W.U. Finance & General Purposes Committee of the Industrial Court award of 8s. 6d. a week to Central London bus crews only.

At a meeting on April 3 between the London Transport Executive and the Negotiating Committee of the Transport & General Workers' Union, Sir John Elliot, Chairman of L.T.E., said:—

"We understand that the union is now asking that an increase of 10s. 6d. a week be granted to all the grades covered by their original claim for an increase of wages. London Transport has been willing to apply the Award of the Industrial Court, but does not accept that there is a case for granting a higher increase in wages or for extending it to other grades. The Central Area drivers and conductors are in a different position from other staff covered by the claim, for the following reasons:—(i) The Central Area drivers and conductors have received smaller increases over the past years than other staffs within and outside London Transport; (ii) there is a substantial shortage of staff in the Central Area; and (iii) the congested conditions in the Central Area of London through which the majority of the Central Road Services drivers and conductors work."

"The outer areas of London where the London Transport country buses operate," he added, "are similar in general character to those in which provincial buses run. The rates of pay of the London Transport Country Bus drivers and conductors are roundly 10s. a week above those of the provincial bus drivers and conductors. London Transport considers that it would be wrong to grant a further increase in pay to their country busmen which would increase the substantial differential between the London Transport country busmen and the provincial busmen.

"As regards the maintenance staffs, their earnings have risen by a substantially greater amount than the operating staffs and by a much greater amount than the cost of living, owing to incentive bonus schemes. Part of the increase in earnings is due to increased effort by the men, but the larger part of the bonus earnings is due to improvements in technique by London Transport which require no additional effort from the men.

"The Executive has received with regret the decision of the union to tender notice of a withdrawal of labour."

Effects of Strike

"It is necessary for me to ask," Sir John Elliot continued, "whether the committee has considered the effect of a withdrawal of labour not only on the public but on their own members, both immediately and in the long term.

"Since 1950, the passengers on the road services have fallen from just under 4,000 million to just over 3,000 million a year. Taking the 1950 figure as 100, the 1957 figure is now 82, and 1958 will be lower still. The causes of this decline are known to all of us; the competition of private motoring and of television, the discouragement of travel by constantly rising fares.

"A withdrawal of labour must result in a sharp increase in the rate of loss of traffic, a proportion of which will never come back because some of the present passengers will have purchased bicycles, arranged to share cars or found other methods of travel.

"Reductions in London Transport road services, due to the fall in passenger traffic, have had to be made and further reductions in service are planned to be introduced towards the end of this month and in June of this year. The sharply increased losses of traffic which will follow a strike are likely to accelerate further reductions in service and further reductions in employment in this industry. At the time of the last official bus strike in 1937 things were quite different. The bus industry was then being run on a rising, not a falling market.

"A withdrawal of labour cannot in my view assist the staff, but the reverse. A strike does not alter facts. It must cause hardship to the busmen as well as to the public who in the long run in a democracy have the final say through the fares they pay. It is to be hoped that, in the time before the notice of withdrawal of labour takes effect, the Union, the Negotiating Committee and the busmen whom you represent will further consider the consequences of what is proposed.

"If the union persists in rejecting the award, then you are telling me that the award is dead because our application of it was publicly stated to be dependent on union acceptance also. This would apply to the amount of increase awarded to the Central Road Services drivers and conductors and to the date of operation of the award which would have been March 12, 1958. Now in that case we are back where we started."

Sir John Elliot concluded: "I and my colleagues are available at any time before May 5 to meet representatives of the Union if it is considered that a further meeting would serve any purpose."

Further Claims by Busmen

It was also announced on April 2 that simultaneous wage claims were to be made immediately on behalf of all the other bus and trolleybus workers in Great Britain. These include employees of municipal undertakings and the workers employed by companies privately owned or controlled by the B.T.C. No figure has been mentioned in connection with these claims. In addition, a claim will be made for payment at the rate of time-and-a-quarter for maintenance men and craftsmen permanently on night duty.

Questions in Parliament

Minister's Letter to B.T.C. on Finance

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport on March 26 if he would make available to Members, by publication in the Official Report, the letter dated October 22 which he sent to the B.T.C. concerning advances to be made to it under the Transport (Railway Finances) Act, 1957, together with the reply he received thereto.

Mr. Harold Watkinson: Yes.

The text of the letters is as follows:—

The Minister of Transport & Civil Aviation to the Deputy Chairman of the British Transport Commission.

October 22, 1957

"I wrote to your Chairman on September 19 about some of the measures the Government had decided must be taken to curb inflation and support the value of the pound sterling. In that letter I explained

that the aim for the public sector was to keep the level of investment expenditure over the next two years within the level attained this year and I gave the amounts within which the Commission would be expected to keep their actual expenditure on investment in 1958 and 1959.

"The same considerations must apply to the advances made to the Commission under the provisions of the Transport (Railway Finances) Act, 1957, to meet deficits on revenue account of British Railways. I am therefore letting you know in good time that it has been decided that for 1958 and 1959 no advance will be made to the Commission above the level contemplated in the White Paper. For 1958, therefore, the amount will not be in excess of the actual ascertained deficit for 1957 as certified by the Auditors in due course. For 1959 the advance will be reduced in accordance with the forecast on which the White Paper is based. I thought that the Commission would wish to know exactly how they stand over the next two years, in the light of the Government's present financial policy, under the provisions of the Act."

(signed) HAROLD WATKINSON.

The Deputy Chairman of the British Transport Commission to the Minister of Transport & Civil Aviation.

"I have received your letter of October 22 in regard to the advances made to the Commission under the provisions of the Transport (Railway Finances) Act, 1957, and have conveyed the contents to the Commission."

(signed) J. BENSTEAD.

Wage Rates on East African Railways

Mrs. Eirene White (Flint E.—Lab.) asked the Secretary of State for the Colonies on March 27 what were the wage rates for locomotive drivers and firemen on the East African Railways, giving separate rates for Europeans, Asians and Africans; what differences there are in the qualifications prescribed for employees in these grades; and to what extent they vary according to race.

Mr. Lennox-Boyd: Since the reply contains a number of figures, I will circulate the information in the Official Report.

The following are the basic salary scales for locomotive drivers and firemen employed by the East African Railways and Harbours Administration. Employees are graded according to experience and skill and not to race.

Drivers (£ a year)

Grade	IV	656 × 28—740
Grade	V	552 × 21—615
Grade	VI	466 × 14—529
Grade	VII	363 × 21—447
Grade	VIII	287 × 14—343
Grade	IX	232 × 14—274
Grade	X	176 × 11—220
(Shunting)		

Firemen (shillings a month)

Main line	186·50 × 10·50—218
Shunting	122 × 5—147

Mileage allowances are payable in addition to basic salaries; free housing, or a housing allowance in lieu, and non-contributory pensions for locomotive drivers and gratuities for firemen are also provided. An inducement addition varying from £173 to £228 a year is paid to drivers recruited from the United Kingdom.

PRODUCTION EXHIBITION AT OLYMPIA.—The third Production Exhibition and Conference will be held in the Grand Hall, Olympia, London, W., on May 12-21. The preliminary list of exhibitors indicated that some 80 organisations will be represented.

Contracts and Tenders

Bogie tank wagon underframes required for Thailand

British Railways Eastern Region, have placed the following contracts:—

W. & C. French Limited, Buckhurst Hill, Essex: provision of staff accommodation, Hertford East

Lorne, Stewart (Heating), Limited, Wembley Hill, Middx: reconstruction of roof to suburban engine shed at Kings Cross Motive Power Depot

Aubrey Watson Limited, Henley-on-Thames: reconstruction of wing walls and refacing of abutments of underline bridge No. 4 between Stroud Green and Crouch End

Blackstone & Co. Ltd., Dursley, Gloucestershire: supply, delivery and installation of one 425-kW. diesel generating set at Ripple Lane New Marshalling Yard

Sir William Arrol & Co. Ltd., Bridgeton, Glasgow, S.E.: reconstruction of superstructure of underline bridge No. 1927 between Stamford Hill and Seven Sisters, and reconstruction of superstructure of underline bridge No. 1937 between Seven Sisters and Bruce Grove.

British Railways, London Midland Region, have placed the following contracts:

Maxwell M. Hart (Glasgow) Limited, Manchester: staff association sports ground, Crewe Branch

D. Matthews & Sons Ltd., Liverpool, 1: accommodation for Divisional Traffic Manager, Liverpool

F. Braby & Co. Ltd., Crayford, Kent: reconstruction of wheeldrop shed, Kentish Town Motive Power Depot

A. J. Binns Limited, London, N.1: fencing renewal programme, 1958, Derby North District

S. & C. Walmsley Limited, Liverpool, 10: design, supply, and erection of structural steelwork, extension to main goods shed, Ancoats, Manchester

Bosworth & Wakeford Limited, Rugby: additional span for Liverpool Corporation road widening scheme at Walton Lane, bridge No. 25, Bootle branch

Leonard Fairclough Limited, Adlington, Lancs: alteration to Bridges 3 and 17, Crewe-Stockport line, main line electrification.

British Railways, Southern Region, have placed the following contracts:—

C. & T. Painters Limited, London, N.W.10: renovations, Victoria Station

The Walter Kidde Co. Ltd., Greenford, Middx: installation of automatic fire protection, Rochester, Gillingham, Shortlands Junction, Rainham, Strood Junction, Barnes and Faversham Signalboxes

Maurice Hill Limited, Horndean, Hants: painting and cladding of new platform roofing, Weymouth Station

The Butterley Co. Ltd., Butterley, Nr. Derby: renewal of superstructure, Fordmill Lane bridge, Catford

Caffin & Co. Ltd., London, W.C.2: strengthening of platforms, Cannon Street Station

T. W. Palmer & Co. (Merton Abbey) Ltd., London, S.W.19: structural steelwork for colour-light signalling, factory junction to Herne Hill

The Pyrene Co. Ltd., Brentford, Middx: installation of automatic fire protection, Sittingbourne Signalbox.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From Thailand:

60 steel underframes for bogie tank wagons, metre gauge, complete with coupling and draft gear device, bogies, brake device, and riggings. Calculated pay load, tare weight of underframes, weight of bogies and other component parts must be submitted with the tender.

The issuing authority is the State Railway of Thailand (Railways Organisation), Bangkok. Tenders in sealed envelopes, clearly marked "Tender for Underframes of Bogie Tank Wagons B.E. 2501 (1958)" and addressed to the Stores Superintendent, must reach the Office of the Stores, State Railways of Thailand, Bangkok, not later than June 10, 1958. A deposit of Bht. 100,000 must be made by tenderers. The Board of Trade reference is ESB/8222/58.

From India:

4,000 tons of quenched carbon steel fishplates in accordance with ASTM specification A-49-53T, maximum carbon content limited to 0.50 per cent and the manganese content limited to 0.80 per cent

Alternatively:

4,000 tons of fishplates for 90-lb. rails in accordance with I.R.S. specification No. T-1-1950 and I.R.S. drawing No. T.059

13,000 tons of mild steel plates in accordance with Association of American Railroads (AAR) specification No. M-116-55, grade A quality

Alternatively:

13,000 tons of mild steel plates in accordance with I.R.S. specification M-5-54.

The issuing authority and address to which bids should be sent is the Government of India, India Supply Mission, 2,536 Massachusetts Avenue N.W., Washington 8, D.C. The tender No. is 86-33-017-9-70295. This purchase will be financed by the International Cooperation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is April 30, 1958. The Board of Trade reference is ESB/8139/58/I.C.A.

From the Sudan:

Signalling material of the double wiring system for 16 stations on the Port Sudan line.

The issuing authority is the Controller of Stores, Sudan Railways, Atkara. The tender No. is 1755. The closing date is May 17, 1958. The Board of Trade reference is ESB/8380/58.

From Portuguese East Africa:

Signalling equipment and barriers for four level crossings.

The issuing authority is the Ports, Railways & Transport Department, Lourenço Marques. The tender No. is 80/58. A provisional deposit of Esc. 30,000 must be made by tenderers. The closing date is June 6, 1958. Local representation is essential. Drawings and specifications are obtainable from the Railway Warehouse at Lourenço Marques through the local

agents of United Kingdom firms interested. The Board of Trade reference is ESB/8387/58.

Further details regarding the above tenders, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

Notes and News

More Cheap Day Tickets in N.E. Region.—Additional cheap day tickets are to be introduced by the North Eastern Region of British Railways from April 14 between a number of stations in the Darlington district.

L.M.R. Express Locomotives to be Painted Dark Crimson. — What is described officially as maroon livery (a dark crimson) is to be borne by 20 express passenger steam locomotives of the London Midland Region of British Railways. No. 46245, *City of London*, has already been re-painted in maroon and others of the same class, the "Coronation" Pacifics, are to be changed from the standard green livery when they go into works for major overhaul. No. 46245 is attached to Camden Depot and works express trains between Euston and Scotland, including the "Caledonian." The change in livery is designed to stimulate the interest of the public and the pride of the cleaning staff and engine crews, as the dark crimson was the standard livery of the former L.M.S.R.

Mr. H. G. Nelson Visits E.A.R. & H. Installations.—During his visit to East Africa Mr. H. G. Nelson, Managing Director of the English Electric Co. Ltd., visited the mechanical workshops and training school of East African Railways & Harbours in Nairobi. The accompanying illustration shows (left to right): Messrs. A. G. Cowley, Works Manager; J. Hudson, Chief Mechanical Engineer; B. G. Mitton, Engineering Director of Boustead & Clarke, Limited; H. G. Nelson; R. C. Skinner, Resident Technical Representative of the English Electric Co., Ltd.; and Trevor Rees, Area Manager, Export Department, English Electric Co. Ltd.

Maintenance Work on Tay Bridge.—The Scottish Region announces that a start was made on maintenance work on the Tay Bridge on April 6, and will be continued each Sunday at the same time during the next two years. This work has necessitated inter alia diversion of the "Aberdonian" from Kings Cross on Saturday nights via Perth.

Diesel-Electric Set to Work Cannon Street to Folkestone Service.—With effect from the introduction of the Southern Region summer timetable on June 9, the 5.47 p.m. from Cannon Street to Folkestone is to be worked by two six-car diesel-electric units, of the type introduced on the Hastings via Tunbridge Wells line last year. The train is being accelerated to reach Tonbridge at 6.28, Ashford at 6.59, Shorncliffe at 7.16, Folkestone Central at 7.19, Folkestone Junction at 7.23 and Dover Priory at 7.34 p.m.

Dismantling Cannon Street Station Roof.—Work was due to start yesterday (Thursday) on dismantling the 92-year-old bomb-damaged roof over Cannon Street Station, Southern Region. More than 1,000 tons of metal will have to be taken down and the work is likely to take up to a year to complete. The station is closed, Mondays to Fridays, between 10.45 a.m. and 3.15 p.m. and completely on Saturdays and Sundays until May 23; outside the business travel period all trains run from and to London Bridge and Charing Cross. The work is part of the reconstruction and modernisation of the terminus. In 1941, bombs blew most of the glass from the roof, which has always been expensive and difficult to maintain. The metal trusses have given no weather protection, which at present is provided instead by small umbrella roofs. Much of the roof is being cut up on a special platform erected on a gantry and trestle on platforms 5 and 6. It will be disposed of as scrap. The final design of the new roof to replace the existing one has not yet been decided as it will depend on the reconstruction of Southern House. In replacing what has been regarded as a London landmark for so many years the Royal Fine Art Commission is being consulted.

Excursions for Glasgow Spring Holiday.—The excursion programme of the Scottish Region of British Railways for the Glasgow Spring holiday includes "all-in" weekend trips to Blackpool with reserved hotel accommodation; refreshment car day excursions to Perth, Forfar and Aberdeen and to Fort William and Mallaig; and augmented Clyde Coast sailings. Many additional long-distance trains will serve London, Liverpool, Manchester, York, and Newcastle.

Diesel Railcar Depot at Cheltenham Malvern Road.—Work has begun at Cheltenham Malvern Road Station on fuelling and inspection facilities for diesel railcars. The scheme involves the construction of an inspection pit 280 ft. long under a canopy, with fuelling points, two 7,000-gal. capacity storage tanks, pumps, a workshop and store, and also the replacement of two staff huts by a modern building. When complete, the depot will be utilised for the inspection and fuelling of seven three-car Diesel multiple-unit sets. The work is being carried out by the Avonmouth Plant & Construction Co. Ltd., St. Andrews Road, Avonmouth.

Charges of Independent Railway Undertakings.—The Minister of Transport & Civil Aviation has now exercised the powers given to him under Section 3(3) of the Transport Charges etc. (Miscellaneous Provisions) Act, 1954, to apply the B.T.C. railway merchandise and passenger charges schemes to independent railway undertakings. He has made two orders: (1) the Independent Undertakings (Railway Merchandise Charges Scheme Application) Order, 1958 (SI 1958 No. 347) which came into force on April 5, and (2) the Independent Undertakings (Railway Passenger Charges Scheme Application) Order 1958 (SI 1958 No. 403) which comes into force on April 12. The first authorises independent railway undertakings, other than those whose railways lie wholly within a dock, to levy charges for the carriage of merchandise by rail in accordance with the B.T.C. (Railway Merchandise) Charges Scheme, 1957; the second authorises those independent undertakings which carry passengers to charge the fares authorised by the B.T.C. (Passenger) Charges Scheme, 1957, for the carriage of passengers otherwise than upon the London lines.

E. P. Barrus Provide Wider Stocking Facilities.—Two American engineering products introduced to this country by E. P. Barrus (Concessionaires) Limited of Acton are now being made in British factories. Devcon plastic steel, available in limited quantities during the last two years, can now be delivered immediately as a result of regular shipments from a manufacturing plant in the Bahamas. Cleveland Cle-Force high-speed twist drills and Mo-Max tool bits, originating from Cleveland, Ohio, are now being made in Peterhead, Scotland, and are therefore once more on the British market, not having been available here for some years. Stocking facilities have been established in association with Smail Sons & Co. Ltd. of Glasgow and Tasker's Engineering Co. Ltd. of Sheffield. Marketing will be carried on under Smail-Barrus Associated,

Mr. H. G. Nelson and other visitors, accompanied by Mr. J. Hudson, Chief Mechanical Engineer, E.A.R. & H., in the railway works at Nairobi

21-23, India Street, Glasgow 2 (telephone: City 3301) and Tasker-Barrus Associated, Blonk Street, Sheffield (telephone: Sheffield 21191). Together with the Acton depot, stocking facilities for all Barrus products to cover the British Isles are provided.

Combined Showroom and Office in Birmingham for Two Smiths Divisions.—English Clock Systems and Smiths Industrial Instrument Division, members of the Smiths Group of companies, have announced the opening of a combined showroom and offices in Birmingham. The address of the new premises is 184, Corporation Street, Birmingham 4. The telephone number is Central 8737.

Anti-Attrition Metal Dividend.—The Anti-Attrition Metal Co. Ltd., which is now a subsidiary of Beyer, Peacock & Co. Ltd., has declared a dividend of 4 per cent for the year ended July 31, 1957. This compares with 7½ per cent and a centenary bonus of 1 per cent last year. The profit was £28,930 (£82,108), before tax of £11,875 (£39,250). Plant replacement reserve was £9,000 (same), and £33,910 (£37,591) was brought forward. The continued fall in price of copper was its effect on stock values, and lower profit margins, have reduced profits.

French Transport Strike.—The 24-hr. strike on April 1-2 of trades union members employed by nationalised transport undertakings in France is reported to have been almost complete on the French National Railways. In Paris a few buses and Métro trains ran. Air services were greatly restricted by the strike of ground crews. The strike was called in support of union demands that the proceeds of increased efficiency in the nationalised industries, and in particular the railways, should be passed on to the workers, and that the differentiation said to exist between workers in nationalised and private enterprise sectors of the economy should be reduced. The unions are stated to threaten further industrial action unless the Government withdraws its outright rejection of their demands.

Freight Service Improvements in Western Region.—Improvements in freight train services have been made by the Western Region of British Railways during the past three months, including the introduction of new express freight trains and the speeding up of others. Among the new services are trains from Avonmouth to Tavistock Junction Marshalling Yard, Plymouth, the introduction of which will provide an improved service for grain and fertilisers which are carried in large quantities to the agricultural district of Cornwall. An express freight service has been introduced from Margam to Swindon for the conveyance of steel forwarded by the Steel Company of Wales from Margam Works to the Pressed Steel Company at Swindon. Revision of services from the Midlands and from Birkenhead to London has also been carried out with considerable saving in transit time; 1 hr. 40 min. has been saved on one train between the latter points.

British Standard for Pipe Threads.—This long-established British Standard, B.S.21, last revised in 1938, formerly specified only fundamental definitions and basic sizes of threads and the permissible tolerances. These have been reproduced unaltered in the present edition; but the text has been revised and extended to include illustrations and recommendations for gauging pipe threads, and tolerances for reference gauges. Two kinds of pipe thread dealt with are jointing threads and longscrew threads. The B.S.P. size range is from ⅛-6 in. nominal bore inclusive, and the standard gives details of thread forms, dimensions and tolerances, together with the method of designating each type of thread. Copies of the Standard, B.S. 21:1957, may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1. The price is 7s. 6d.

Tubewrights Mechanical Handling Projects on Show.—At the Mechanical Handling Exhibition to be held at Earls Court, London, from May 7-17, Tubewrights Limited will exhibit a representative range of its products, including stacking post pallets, collapsible crates, stillages of various designs, and the recently developed patented Markussen pallets. A section of adjustable tubular steel racking will also be seen. A comprehensive model will illustrate dockside handling of materials. Besides showing pallets in use it includes crane jibs, gangways, roof trusses and towers of tubular design. In model form, also, are shown footbridges, together with a large model floodlighting tower suitable for stockyards and sidings. A display of photographs shows other examples of the application of tubular steel construction to materials handling problems.

Five Brush Companies at the Hanover Fair.—Five Brush companies in the Hawker Siddeley Group will be exhibiting at the German Industries Fair at Hanover, which takes place from April 27 to May 6. The companies exhibiting are the Brush Electrical Engineering Co. Ltd., Loughborough; J. & H. McLaren Limited, Leeds; Mirrlees, Bickerton & Day Limited, Stockport; the National Gas & Oil Engine Co. Ltd., Aston-under-Lyne, and Petters Limited, Staines. Brush Electrical will exhibit its 20 series turbocharger for diesel engines. This has a rating of 2:1 pressure ratio, 4,000 cu. ft. per min. It will be a sectioned model. The other companies will show examples of their range of diesel engines for industrial and marine applications.

Reduced Rates for Motorcars to Ireland.—To encourage motorists to take early holidays in Ireland, considerable reductions in return rates for cars, caravans, and luggage trailers between ports in Great Britain and ports in Ireland during the month of May are being announced by British Railways. The concession return rate for a 15-20 cwt. car between Holyhead and Dublin will be £15 14s. and between Fishguard and Rosslare £12 10s. 5d., reductions of £4 18s. and £3 16s. 9d. respectively.

Death of Sir James Milne

The G.W.R. house flag at half-mast over Paddington (*see pages* 411 *and* 429)

"Deltic" Locomotive in London Midland Region

Prototype English Electric 3,300-*h.p.* "*Deltic*" *locomotive at Liverpool Lime Street Station, on the* 2.10 *p.m. Euston train during recent trials in the London Midland Region* (*see our issue of December* 27, 1957)

The only stipulation is that cars must be accompanied by not less than two adult saloon passengers, and travel by the same route on both outward and return journeys.

Lancashire Steel Corporation Limited.—As from April 1, the Irlam and Warrington Works and the manufacturing and trading activities of the Lancashire Steel Corporation Limited have been owned and operated by Lancashire Steel Manufacturing Co. Ltd., a new company completely owned by the Lancashire Steel Corporation Limited. The constructional and general engineering business, which has been carried on in the name of the Pearson & Knowles Engineering Co. Ltd. as a branch of and agents for the Lancashire Steel Corporation Limited, is transferred to and operated by the Pearson & Knowles Engineering Co. Ltd., which remains completely owned by the Corporation.

Forthcoming Meetings

April 11 (*Fri.*).—The Railway Club, at 320, High Holborn, London, W.C.1, at 7 p.m. Paper on "The L.S.W.R. Story II—A cold welcome in Portsmouth," by Mr. K. G. Carr.

April 11 (*Fri.*).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1, at 7.30 p.m. Paper on "Narrow gauge wanderings in Europe," by Messrs. G. W. Morant and H. Cuff.

April 14 (*Mon.*).—Institute of Transport, Metropolitan Section, at 80, Portland Place, London, W.1, at 6 p.m. Paper on "Reducing manual labour in handling raw materials and merchandise—possibilities and problems," by Mr. E. G. Whitaker.

April 14 (*Mon.*).—Permanent Way Institution, London Section, at the Headquarters of the British Transport Commission, 222, Marylebone Road, London, N.W.1, at 6.30 p.m. Paper (illustrated) on "High speed turnouts and crossovers," by Mr. W. A. C. White.

April 15 (*Tue.*).—Institution of Electrical Engineers, Measurement and Utilisation Sections, at Savoy Place, London, W.C.2, at 5.30 p.m. Papers on "A train performance computer," by Professor E. Bradshaw, M. Wagstaff, and F. Cooke. "The simulation of distributed-parameter systems, with particular reference to process control problems," by Messrs. J. F. Meredith and E. A. Freeman, and "A magnetic-drum store for analogue computing," by Messrs. J. L. Douce and J. C. West.

April 16 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, at 1, Birdcage Walk, Westminster, S.W.1, at 5.30 p.m. Paper on "Steel for railway purposes," by Mr. J. Dearden, Assistant Superintendent, Metallurgy Division, Research Department, British Railways, Derby, and Mr. J. E. Roberts, Research Department, Colvilles Limited, Motherwell.

April 16 (*Wed.*).—Railway Correspondence & Travel Society, West Riding Branch, at the Talbot Hotel, Kirkgate, Bradford, at 7.30 p.m. Paper on "Early history of the steam locomotive to *circa* 1850," by Mr. C. A. Hill.

April 17 (*Thu.*).—Institution of Mechanical Engineers, Applied Mechanics Group, at 1, Birdcage Walk, Westminster, S.W.1, at 6 p.m. Discussion: "Training in engineering design."

April 19 (*Sat.*).—Permanent Way Institution, Manchester & Liverpool Section, at the Manchester College of Science & Technology, Sackville Street, Manchester, at 2.30 p.m. Paper on "Factors in the running of a high speed train service," by Mr. O. S. Nock.

April 19 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Cambridge, at 2.15 p.m. Paper on "Long-welded rails," by Mr. J. Game.

Railway Stock Market

There has been rather more business passing in stock markets, where the main feature was a good rise in British Funds in response to continued talk that the Bank rate may be reduced further to 5 per cent in the near future. In general, however, markets have lost part of earlier buoyancy because fears of the prospect of a bus strike seem to have had more influence on sentiment that hopes that the Budget may bring some tax concessions. Meanwhile, the latest news from the U.S.A. does not suggest that the trade depression there is being halted. The £82,000,000 increase in British gold and dollar reserves last month certainly shows that there is good backing for the strength of the £; on the other hand, the City recognises that over the next few months, dollar earnings may decline sharply, and that looking ahead, the autumn is normally a difficult period for our reserves. It may be, therefore, that the present is not a time to take an optimistic view of the outlook, though it can be argued that stock markets have been too cautious and that they would show good response if the Budget were to bring a cut in Profits Tax and other concessions to stimulate industry to meet difficult times that may lie ahead.

Few dealings were recorded among foreign rails, which showed no particular trend. Antofagasta ordinary stock at 15¼ was virtually the same as a week ago, while the preference stock remained at 34½ and the 5 per cent (Bolivia) debentures remained at 94½.

San Paulo Railway 3s. units changed hands around 2s. again, but United of Havana second income stock eased from 6 to 5¾. Costa Rica ordinary stock at 17 and Chilean Northern 5 per cent debentures at 35 were the same as a week ago, while business at 11 was recorded in Paraguay Central 6 per cent debentures, but Mexican Central "A" bearer debentures moved fractionally lower at 68.

Peru Transport "B" shares were again quoted at $\frac{1}{2}$, and White Pass shares have changed hands around $14\frac{1}{2}$. In other directions, Canadian Pacifics at $46\frac{1}{4}$ compared with $46\frac{1}{4}$ a week ago, while the preference stock remained at 53¼, and the 4 per cent debentures moved up from 65 to 66¼. International of Central America common shares were again quoted at $21\frac{1}{2}$. Brazil Railway bonds kept at 5. Business around 24 was recorded in Wolmar Railway 4½ per cent bonds.

Rather more business was again reported in the shares of locomotive builders and engineers. North British Locomotive were again favoured in the hope that earnings were showing some improvement, and the shares have strengthened afresh from 13s. 9d. to 14s. Elsewhere, Birmingham Wagon remained under the influence of the annual report and the better earnings, and at 17s. 6d. have held all but a small part of their recent rise. Charles Roberts 5s. shares eased from 8s. 6d. to 8s. 3d., but on the other hand, Beyer, Peacock 5s. shares improved from 7s. 1½d. to 7s. 4½d. Gloucester Wagon 10s. shares at 13s. and Wagon Repairs 5s. shares at 11s. 4½d. were slightly lower than a week ago. Westinghouse Brake became more active and strengthened from 36s. 3d. to 36s. 6d. G. D. Peters were again firmly held and quoted at 30s.

Associated Electrical eased slightly to 48s. 9d. General Electric have been maintained at 30s. 6d. while English Electric moved up from 51s. 6d. a week ago to 52s. 3d. Pressed Steel 5s. shares at 15s. 4½d. kept the rise which followed the past year's results, but in other directions, Ruston & Hornsby have eased from 26s. to 25s. 6d. At 34s. 3d. the 10s. shares of the Dowty Group held their recent advance. British Timken have been firm at 47s., Ransomes & Marles 5s. shares were 10s. 7½d., Alfred Herbert 62s. 10½d., Vokes 4s. shares 14s. 4½d. and Stewarts and Lloyds held steady at 21s. 6d.

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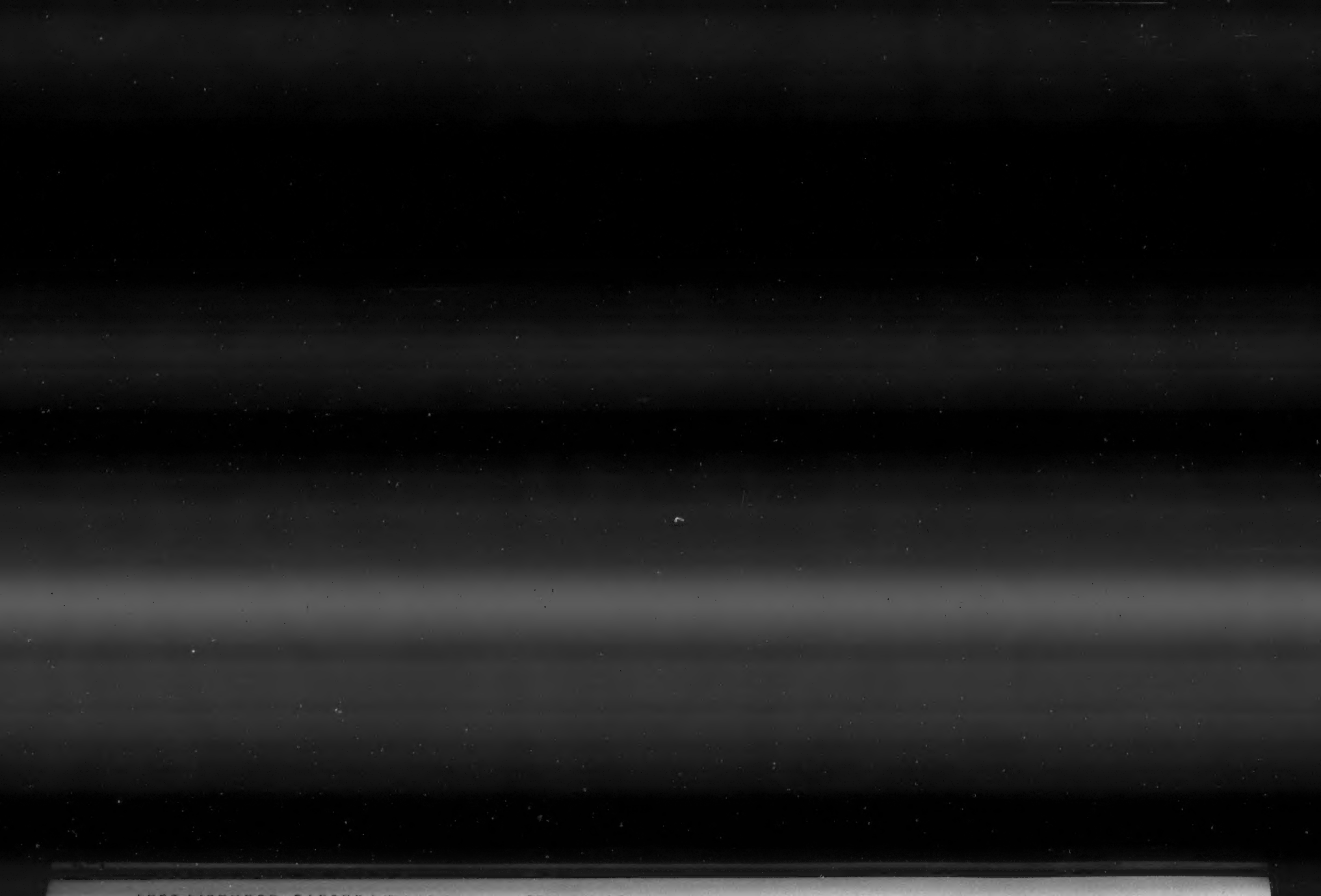
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